

THE  
RATIONAL FARMER:  
OR A  
TREATISE  
ON  
AGRICULTURE AND TILLAGE:

Wherein many Errors of common Management are pointed out, and a new improved and profitable System suggested and described; interspersed with many occasional and interesting Observations.

SECOND EDITION.

To which are added,

Some useful Notes; together with a short Essay on the Dearness of Corn, and other Provisions.

By MATTHEW PETERS. 12

Member of the Dublin Society for the Encouragement of Husbandry, and other useful Arts.

*J. O. Johnson*

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TO THE  
SOCIETY AT LONDON,  
FOR THE ENCOURAGEMENT OF  
ARTS, MANUFACTURES, AND  
COMMERCE.

THIS TREATISE ON AGRICULTURE,

IS HUMBLY INSCRIBED,

BY THEIR MOST

OBEDIENT SERVANT,

MATTHEW PETERS.

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COMMERCE

THIS TREATISE ON AGRICULTURE

CULTURE

IS HUMBLT INSCRIBED

BY THE AUTHOR

GEORGE RIVINGTON

MILTON PATTERSON

# TO THE R E A D E R.

THE following treatise on agriculture, is adapted to inform the impartial, the prejudiced cannot be benefited by instruction; they can scarcely be deemed rational beings, and are therefore unfit for social conferences. However, though there are such animals interspersed, yet, this is no reason why the more prudent and candid, should be deprived of any salutary instructions for the improvement of their minds, or increase of their fortunes.

Agriculture may be justly called a *Science*, and indeed it is a noble study. The first wish of Virgil was to be a good philosopher; the second, a good husbandman; and God dealt with him, as he did with Solomon; he made him one of the best philosophers, and the best husbandmen, and to adorn and to display the honours of those characters, the best of poets\*. He made him, besides all this, a rich

\* Vide Cowley.

man. *Columella* says " husbandry is next in kindred to philosophy, as it comprehends more parts of philosophy than any one profession, art, or science in the world." Cicero, " declares the pleasures of husbandry, to approach the sacred entertainments of the philosopher;" and our once celebrated, but now too much neglected Cowley observes, " The three first men in the world, are a gardener, a husbandman, and a grazier."

But alas! how few of our present cultivators of land, can lay claim to these honours! unimproved by science, untaught to make judicious and rational observations, to try experiments and draw conclusions, in order to attain the truth; they know no more than what they have learnt from their fathers, and foolishly conceive that all knowledge is centered within their poor and shallow ideas.

It is owing to such men that agriculture is restrained in its progress, and ungratefully deny'd in the bounties it would bestow. They know nothing of the qualities and operations of bodies upon each other. That if they eat, indeed, it will assuage their hunger, and if they drink plentifully of strong liquor, it will make them drunk, they can very well witness; but talk to them about powers, whereby their draught is to be eased, or of alkaline salts, with which all vegetable and animal substances



substances are replete, as being material agents in the work of vegetation, &c. they will think you not sane; or, at best, pronounce you a little mad-dish.

Thus did Sir Walter Blyth lament, *Improver Improved*, page 4. "There is, says he, among you, " a calumniating and depraving every new invention: and the most guilty of this are your old, " mouldry leaven, who themselves and their fore- " fathers, have been accustomed to such a course " of husbandry as they will follow, and no other. " What forsooth, says this self-sufficient man, who " taught you more wit, than your forefathers? " Would they have neglected this advantage had " there been any? This proud and unteachable " spirit an ingenious man abhors; which banes " and poisons the very plenty of the nation."

The author of *Discovery of Hidden Treasure*, says, page 86. "I wish that they who love not to try " experiments, may take their ease, and will lay " no heavier task upon them, than to wish well to " others; only I beg them to consider what a " wretched case they themselves had been in, if " some more inventive brains had not found out " the plough, and the use thereof; as also, if " some of a like disposition had not discovered " new ways for the fructifying of land, when its " worn condition refused encrease sufficient to " maintain the numerous people."

But

But why should it be wondered at, that new instructions are turned into ridicule, when so many recently known artificial grasses are so much rejected? The ignorant say, they will not do in this part of the country, the same sort of people say the same elsewhere, so that in fact, I may comparatively say with Solomon, one farmer among a thousand I have found, but not one husbandman among all these, have I found! "Our forefathers," say they, "never used them;" idleness never wants an excuse: why might not our ancestors upon the same ground, have held their hands in their pockets, and presumed that turnips, or clover would not grow amongst us. It is well known what opposition was made to turnips but a few years since by the farmers: what would they now part with them for? Let them from this circumstance consider and be wise.

Emulation is the only spur to improvement and knowledge in every art and science; the author therefore earnestly recommends it to the industrious husbandman; there is not a more stimulating ingredient to attain wealth and honour: it is such a justifiable ambition, that without it, man becomes a low and despicable creature, it is a social virtue, the characteristic of wisdom, and the only step to render him useful in society.

At

At this time in particular, there are some circumstances to engage the attention of the farmer, to every hint of improvement: the progress making in our rival kingdom, France, in agriculture, as well as trade, is truly alarming: this should be looked on with a jealous eye, as the bulk of the people in England, are the immediate manufacturers of our commodities.

If real and solid improvement in agriculture, and all sorts of husbandry are wanting, and land yet continues to rise, it is manifest that provisions must rise in proportion; and it is as manifest, that such advance must ultimately fall on the price of our goods; our trade must then suffer, and an opportunity will be given to our natural enemies, not only to under-sell us for a time in foreign markets, but to establish themselves firm and permanent in their advantages. It is too notorious that they have lately shewn a greater concern for the improvements of land, than our countrymen; a circumstance more to be dreaded than their mighty armies, or their encreasing fleets.

The author would not unnecessarily swell these introductory remarks; he just mentions therefore, that in the following sheets, the use of the spike-roller, scarificator, and Duckett's two coulter and share plough, for breaking up lay land is introduced; manures are properly and distinctly considered;

sidered; the doctrine of vegetable manures discussed and recommended; and observations are made on the quantity of wheat generally sown on an acre, together with a table of calculations, wherein the number of grains of wheat, which one acre will take, distributed from one inch to twelve inches square, is set forth.

The clay-kiln is described with its great use in providing a cheap quantity of clay-ashes, which are very fructifying in cold strong land.

A new system of rearing pigs is suggested, with the proof of profit, and use to the ground from their feeding upon it: the feeding black cattle with turnips, the turnip-rooted cabbage, &c. is taught, and some remarks on artificial grasses, with many other instructing occasional observations on various subjects, are freely submitted. As the author is desirous of making this small performance as useful as he can, within the compass of a little more additional expence to himself, than his proposals set forth, he hath added a construction of the Norfolk plough, with his observations upon it.

On the whole, use is the intention of the writer; if this end be secured, he flatters himself the inelegancies of his manner will be excused, and he will be happy in the idea, that he has paid the best acknowledgment to his subscribers.



## THE RATIONAL FARMER.

**T**HE first observation of the farmer will be on the nature of the various soils he is about to improve, and as various as he may find them, he will in due course find them all respectively useful under proper management.

Land is like the heart of man, some naturally better, some worse; all imperfect, and requiring much study and cultivation.

I shall therefore proceed on the several textures of land in general, as each field cannot be distinctly considered.

The first to be noted is a strong clay soil, as being most fertile when properly brought into action, attended to with opposing manures, and the water judiciously drained off.

To fit such land for corn, the farmer should be possessed of a good yoke of oxen, and a strong plough; then, as soon as the weather

weather in the spring will admit, before it is too dry and hard, he must break it up, not more than four inches deep, and very regularly turned, having first scarified it with the scarificator cross ways : this breaking up will be easily done, be the soil ever so stubborn, with four oxen of about seven or eight hundred weight each, a sharp coulter, and a short plough ; for in such land a sharp coulter is a very material ease to the draught.

In about a month after, cross plough it (with a sharp coulter as before) not entering more than one inch deeper than the first ploughing.

At the beginning of May, the strong earth will be so much meliorated, that a heavy drag, or harrow, with well sharpened teeth, will cut and break it to pieces : if the land should be rushy, or any stubborn lumps of grass, or sedge, remain on the surface of the ground, you may gather such together, and burn them in different heaps on the land, and spread the ashes immediately : then plough the ground a third time, which will bring the season to the middle of May, ploughing it an inch deeper than the last time, and turn the ground very evenly, and let it lie a fortnight unharrowed.

The beginning of June, sow it with turnep-seed on the rough surface, pretty thick, and only bush  
cover.

cover the seed; (sowing this land with turnip-seed; at this time, is only a substitute for sea-sand, or other opening manures, if such cannot be obtained) as the more hollow and exposed the parts are, the greater effect the weather will have on it.

In August, roll the turnips smooth, when they are very dry, with a spike-roller, as hereafter described, then plough them in, letting the ground lie in the rough, until the beginning of October; at which time harrow it well, and plough it up for the fifth and last time in narrow ridges to receive the wheat; which should not be deferred longer in such land, for fear of a wet season ensuing; if this work can be done in August or September, 'twill yet be better, for this reason: and it will ripen more seasonably, as all corn ripens later in a strong, than a light soil.

Ploughing in turnips with their full vigour of leaves, opens and divides the compacted texture of the land, and enriches it to a degree, not so easily to be conceived as experience has demonstrated: and I may safely pronounce, that this first and short tilth for wheat, if sowed, as 64 pounds weight to a statutable acre, will produce 2100 pounds weight in return; which is, at 64 pounds to one bushel, near 33 bushels Winchester. If I could prevail on the farmer to lessen the above weight of 64 pounds

to 48, I am sure he would find his account in it, if his land is in good order.

Here I would enforce it on the farmer, to cut his wheat before it is dead ripe, or, at least, earlier than the general manner: the advantages of which are obvious, as wheat thus long standing will lose much even by a gentle blast of wind, and the necessary works of reaping, binding, &c. and this of its best grains.—Whereas, if cut a little green, or before it arrived at the common ripened state, there would be no loss, or, if any, only of the worst, or small grain.

I also recommend to him to pen his sheep on the last ploughing, before he sows his wheat, and then sow and harrow the sheep dung and wheat in, or very lightly plough in the wheat if the land be light, and then roll the ground with a heavy roller, or pen on the wheat as soon as it is harrowed in. My opinion is in favour of the former practice, because all the dung is then covered; whereas, by the latter, the dung is left uncovered to be robbed of its nutritious juices by the air and sun.

As soon as the crop of wheat is removed from the land, spike roll it, and plough in the stubble with the strong plough, one inch deeper than the former ploughing, which will bring the tilth to seven inches: under this fallow let it lie through the



the winter in very narrow ridges, while the farmer is considering what he shall next do with it.

I shall certainly recommend wheat again, to give an opportunity of finally reducing it to an effectual state for future tillage, and orderly crops. For, as the first well given blow is half the battle, so the first proceedings in reducing ground for tillage judiciously, or otherwise, are the making, or marring it: one good crop of wheat has been already obtained, it will not be prudent to load this heavy land with spring corn, as the parts are not yet sufficiently relaxed and divided after the winter's wet.

To bring the whole mass into a fruitful body, it will be proper to harrow the rugged fallow in March, or April; as soon as the moisture is well dried up, then spike roll it when the surface is dry, and plough it up, and in June sow it with turnips, on a spike rolling which you may then give it; or in April, sow it with buck wheat, two bushels to an acre: in either case, sow it on the rough surface, slightly covering the buck wheat with a light harrow, or the turnip-seed with a bush. In July, or August, plough either of them in, and let the ground lie in the rough till September, at which time harrow and spike roll it. The spike-roller is formed by fastening many spikes to the roller, standing out seven or eight inches all round, so as to cross each other

other in entering the ground ; as the teeth in the harrow are fixed in oblique directions, to take the intervals between each tooth, with the sharp part on the side of the spikes, which first enter the ground ; they must be of the form of the harrow teeth, oppositely set, the hollow, or concave part of the tooth being the sharpest side\*. —A figure of this useful implement is given in the frontispiece of this treatise†; the use of which may be easily conceived, as it is fitted to loosen the ground in so deep a manner, and break up the fallow almost equal to a ploughing, that it may sometimes be a substitute for it, when the farmer is much hurried.

If the farmer has used only vegetable manure, it will be necessary now to call in the aid of some one of the five following articles, viz.

Sea-sand, roche lime, sea coal ashes, or fine cinders, burnt clay, or the rubbish about a brick-kiln, Either will open and keep the parts so disunited, as to carry off the wet, which otherwise would lodge in this stiff earth.

In October, sow the wheat as directed, with no more

\* This sort of spike roller will not clog, provided the earth be a little dry on its surface. I distinguish between spike and spikey roller, the spikes of the latter being more short and diminutive ; for which reason such did not answer the end of the invention, &c.

more than 64 pounds to an acre, being nearly seven ounces to one square perch : I am satisfied the farmer will have more, and better wheat, than if he sowed 128 pounds ; it is a great saving of seed, and the land being so highly tilled, and free from those pernicious weeds and vermin which are brought into the ground with dung, he may be assured, that there will be but proper room for the wheat to stock, as the distance of each grain will be but about 3 inches, (see the table) which I flatter myself will be allowed but a reasonable distance in this land : every man's reason must tell him, that the closer the plants are to each other, the less can such plants stock, and of course, fewer and weaker must be the shoots from so oppressed a parent.

Hence, a general weakness takes place through the field, which is unable to support its excessive demands ; then mildews, smut, and bad air, lay hold of the weak vegetable, and it languishes like disordered man.

As to one of the above manures, roche lime, it should be noted, that the custom is to lay out the lime after it is slacked, or let it slake on the land before it is ploughed in, but I beg the farmer more wisely to plough in the lime, and let it slake

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in the earth; if lime be flaked in the air, a large quantity of the best and most active particles are evaporated and lost; whereas if it be flaked in the sand for the mason, or in the earth for the farmer, where all its powers are required, the whole strength is preserved within the bowels of what we want to nourish.

After this second crop of wheat is sowed, I shall leave the ensuing course to the farmer's own judgment, having delivered the land into his hands in a state fitted for his future comfort: I shall next consider the proper management of a kindlier soil, and which requires more tender treatment.

It will be recollected, that I advised to break up the strong clay land between wet and dry, and then to let it remain in that state for some short time to meliorate. The present soil to be considered, does not need that critical observation, or any time to lie at rest, but on the ploughing it up (suppose in April) it should be sowed directly with buck wheat in the following manner.

First, with a common plough make a deep furrow up one side and down the other, the breadth of every ridge you so intend to break up; and then with the double share and coulter plough, finish the ridge. The construction and use of this machine is worth attention. One share and coulter is fixed a little before, and higher than the other;



other; the foremost and uppermost is light made; the coulter cuts the breadth of the sod; the share is made to skim the sod off, with a light wing-board, to turn it into the deep furrow of the common plough; the other share and coulter being close set behind the first, and a little lower, turns the earth (just uncovered) upon the sod which left it, and so forms a new deep furrow for the reception of the next sod, &c.

This is the use of the double share and coulter plough, in land which is not too stiff, rugged, and stoney. The sod being thus covered, it will rot while a manure is growing over it, therefore, as soon as the land is ploughed, sow it with buck wheat, two bushels to an acre, and roll the ground with a common roller, to prevent the sun and air from drying the land too much.

In June, or July, as soon as the buck wheat is in full blossom, roll it flat, and plough them in: this will be the second ploughing, which should be a little deeper than the first; harrow the ground, and sow it with turnips pretty thick. Here observe, that while one manuring of buck wheat, of five or six shillings charge, is rotting, a second manure of turnips of one shilling expence only, is growing on the new turned up stratum.

As soon as these turnips, which are not to be howed, are in vigour, roll them flat and plough them

them in decently, and well cover them: let the ground lie under this third ploughing till October or November, after the heavier land is sown, when you will plough it for wheat; at this time harrow it smooth, and spike roll it, then plough the ground and sow it with 64 pounds to an acre. The quantity of wheat to be sowed ought, however, to be determined by the quality of the ground: if very dry, I would sow the quantity mentioned; if less dry, 54 pounds; and if next in quality to a heavy soil, 48 pounds: observing this as a constant rule, to creep by degrees into the earth, and steal a depth every manuring; and as the land increases in richness, to lessen the quantity of seed. Thus, by proper attention in the course of tillage, in a dry soil, great advantage may be obtained, by creating a staple where there was none, or, at most, but very little.

I cannot tell the farmer that the soil which is dry and shallow, will produce a crop like the strong, but I may assure him, a dry shallow soil may be made, with a trifling expence, to yield nearly double the produce of what he generally receives from it.

The method above described of breaking up, or bringing in land for tillage, serves for every varying degree of land, between the rough, rushy, strong, and the stoney, or flint ground.

Where

Where the sod of either cannot be so easily skimmed off, the flinty surface must be turned up with the common plough, and husband-like gone over in April, then it should be sowed with buck wheat; and afterwards, as in the former process, with turnips, with this only difference, that you must give such broke-up land a ploughing or two extraordinary at the sowing time.

Pasture land being thus prepared for a course of tillage, the successive rotation of cultivating it shall be noticed in its place. I now proceed to the subject of manures.

And first, you will observe in the past proceedings, no mention has been made of dung to enrich the land; and if I am not forgiven that omission, how can I expect pardon, when I tell the farmer, it must not be mentioned when tillage is spoken of; unless we go into a system destructive instead of improving.

Dung on corn land is fit for nothing but to fill it with weeds and slugs, the greatest enemies to agriculture. Will you then pursue, with your eyes open, a system of tillage which is daily injuring you? Let dung be dismissed to the proper province where it alone can be useful.

Preserve it for the pasture and meadow ground, and keep the dunghill, or mixen, decent and compact; let every thing which may be found about

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the farmer's house that will decay, be carried to it, and sacredly kept for this service. Encourage the growth of grass with its proper manure, and let tillage enjoy only what is best adapted for itself.

Dunging your pasture land, will enable you to provide a greater substance for rearing cattle than otherwise you could do; it will speedily advance the value of the land, by making it rich and flourishing, instead of poor and meagre. Encrease your purse with your pasture profit; let every part of your farm give its willing aid; each part will ambitiously do it, if judiciously treated, and vie with each other to smile before its master.

Vegetable manures are adapted for corn only, they are the best and cheapest of all manures; there is a richness in them, that neither sea sand, lime, burnt clay, &c, can boast; these only open and separate clogged earth, and more aptly prepare it for vegetation: But vegetable manures, by their fermentation in the earth, impregnates it with a substantial essence. Therefore, the sea-sand, &c, may be called preparatives for vegetation, and the natural manures vegetation itself.

Vegetable manures will also abolish, by degrees, darnel, poppies, and all stinking filthy weeds; they will, as it were, purge away all stoppages and interruptions of the well-being of the corn, as proper  
per



per diet and regular nourishment will correct and remove bad humours in the constitution of man, brought on by unwholesome food and irregular living, and restore the shattered enervated body to health and vigour.

A dung-hill is, through necessity, a collection \* of all manner of trash, subject to every seed of the many weeds that are threshed out and winnowed from amongst the corn; and what can be expected from its being laid out on the ground, but what is received, a crop of weeds.

The farmer, to remedy this evil, makes use of a subterfuge too mean for a man in his senses: He sows an over-crop of corn, greatly to his loss and injury, to keep under the filthy weeds which he has just put out on the land.

Besides that, vegetable manures, clover, vetches, turnips, &c. the pure offspring of nature, have no seeds of filth to accompany them in performing their function of nourishing the earth; they are also the cheapest.

Let the farmer tell me the expence of laying out dung on an acre, when it is carried to a considerable distance, and the loss of the pasture land to which it should be destined;—the farmer hesitates—and therefore I will submit to him

\* Such dunghills may be called aggregates of compost Stercoraries.

him the charges of my two vegetable manures in a summer.

For two bushels of buck wheat,	5 or 6 s.
For 3 quarts of turnip seed	1 s. 6 d.
For a man to sow these seeds	1 s.
For carrying them to the field	nothing
In the whole for manuring an acre twice,	
about	8 s.

Now, will the farmer write down at the end of the following articles for the dung manuring,

To carry out the dung, the cart and horses	}
A man's wages and diet	-
A man's labour to spread the dung	-

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Total - -

*Will not the difference be very striking?*

If the land be of a close texture, I recommend turnips, or vetches, for the first manure, in preference to buck wheat, or sain foin, as they are more firm, and less reduceable, and therefore more fit to keep open the pores of heavy land. Buck wheat and sain foin, are suited to a lighter land, as they possess a more glutinous substance. The opposing of bodies is the grand secret in agriculture, with which every farmer should have an acquaintance.

As

As an easy illustration of this axiom, let us consider how hard, inactive, and useless is a piece of lime stone, or flint: In this state of inactivity are all earths deeper than the sun's influence can affect; but as these, when raised from cold and darkness, to warmth and light, are rich and useful; so the flint, or lime stone, exposed to the piercing fire, immediately becomes an animating substance. The flint, or lime stone, being a close and hard body, requires a more intense and powerful dissolver, than common earth; for as bodies are in quality, so in proportion must be the opposers.

Thus lime stone has the intense opposer fire applied to it, and no sooner has gone through the operation, than it becomes an agent in vegetation, and animates the clogged earth, when just before it was a thousand times harder than what it now enlivens. Sea-sand, &c. are, on this principle, opposed to wet heavy land.

In short, our whole system consists of opposing qualities; nor is any thing made in vain. It is to be observed, that manures should ever be changed in opposite alternatives, like the successions of corn, be they of the natural or artificial kinds; never manuring with the same kind twice, if it can be avoided, remembering this phrase—

*rotation of opposites.*

if

I am now to treat on the various sorts of manures, which I call artificial, or preparative, such as burnt clay, sea sand, lime stone, marle, scourings of ditches, sea weed, or ooze, dung of fowls and birds, sheep dung, woolen rags, salt, lime, foot, hog's dung, and their hair, neat's hair, horn shavings, malt dust, and soapers waste, or lees. With some observations on frost and snow, so far as they relate to the farmer's useful intelligence.

Clay is by some writers distinguished into twenty-two different sorts, out of which I shall only mention three as needful to our discourse, *viz.* Fuller's earth, the blue or coloured, and strong, heavy stubborn clay.

The first, or fuller's earth, is in great plenty in Staffordshire, where its usefulness is first considered in scouring and cleansing woolen cloth, from the oil and grease made use of in that manufacture. But it is also a high manure for all land, not inclinable to clay: when it is exposed to the air and rain, it instantly dissolves into a fructifying state, and by its solid nature, conjoins the parts of a light soil, and forms them into a compacter body.

The second or blue coloured clay, is what they call in the Isle of Wight, malm, or clay marl. The air affects this clay in much the same manner as the former, and its action is much the same



same: it is well known to some parts of that Island, to have been of infinite use to the land for wheat; there are various tints, or colours, veined through it in the pit; it is intirely free from stones, or grit, and abounds with saline particles.

The third, or common strong clay, or heavy earth, is well known in many low places, and as often found in some countries, even on the hills. This is nearly the sort of land I begun with, in this treatise, to reclaim. In itself it has a durable quality; it is replete with natural salts, which are locked up in it, and must continue till opened by the labouring hand. There are degrees of quality in this sort of land, notwithstanding which, all that come under the denomination of strong clay land, will make for itself the manure I am about to speak of, viz. clay burned in a kiln.

The process is thus, in one or two parts of the worst and rushiest situation, mark out a round inclosure, of 17 feet diameter, and dig out two trenches, crossing each other at right angles, the extent of this circular mark; and in the centre, where these trenches cross, make the opening two feet or more wide; this middle opening may be filled up with loose stones to the surface of the ground, and the cross trenches, (or more properly the air funnels) must be covered with stones  
that

that may reach across, not so close to each other as to prevent a quantity of air passing up between them.

When this is done, make a sod, or clay wall, 18 inches thick for the inclosure, about 4 feet high, the other dimensions will appear in the draught at the front of this treatise. In the centre, put two or three furze faggots, and six good wood faggots, and a few blocks, covering them slightly with more furze, on which lay a covering of clay, dug one spit deep, any where most contiguous on the outside of the kiln, where all the supply for burning is to be regularly dug; on this clay covering, lay another course of furze faggots, and another covering of clay, and then set fire to the furze at the place where the funnels cross each other, as the air will draw up through, and set it properly a-burning; afterwards the whole attention is to prevent the fire blazing through, and at the same time not to smother it too much.

Proceed thus till the kiln, or inside is full, putting in more, and a deeper digging of clay, as the fire may advance, or burn thro'; and last of all, throw the wall in, to burn with the rest, as its use was only to prevent the wind from having effect on the fire: if there is a depth of clay, you may

may dig as deep as you please, provided the clay is not full of water when you put it on the fire. You may form different kilns about the field at pleasure, if designed for manuring the same field; and in that case you may burn it more than if it is designed to be laid on a light soil.

Thus burned, this clay is excellent manure, even for its own soil, and for all cold ground, on which you may lay a large quantity, it comes cheap, and may be had at times, when other manures may not be obtained; it is profitable also for dry shallow land, when not too much burned, but rather charred.

Sea sand is a good manure for all tilled land of the cold and heavy kind, it opens the pores, warms the cold chilled earth, and adds, by its abundant salts, great vigour to the clay soil when exposed to the air: Where plenty of it can be easily got, the farmer may reckon on every advantage from its use.

Limestone gravel is also an admirable manure for all moist land, it is the common gravel of Ireland, and the common manure of that country. It is so called from its being lime stone; every one, even the minutest, readily burning into lime.

Marl is another manure much used in some parts of England, though unknown in others: the want of which is by many much lamented. I

am bold to say, that to E. it is not equal. would

would not depreciate what I know is useful, but, to correct such errors, let me observe, that providence has almost every where appointed some manure adapted to the soil. Man, since the paradisaical state of spontaneous plenty, is not to stand still and expect manna to be dropping into his mouth. He is destined to labour, and in that labour to find his relief: by searching into the nature of things, he employs and improves his distinguishing capacity of reason; and thus becomes also a generous provider for the wants of the irrational species, who in return are ready to repay his benefits.

Stone marl is found in the hills, and is of a chalky species, but more grey, and of a soapy dissolving nature; it is good for corn, or pasture ground, where it doth not partake too much of its own kind, though some lay it indiscriminately, and, as they find, with profit, on all sorts of land.

Some hilly, white, chalky marls are much better than others, which may be discovered by bruising a small bit, and putting it into a little strong vinegar; if a bit is put in whole, no more of it will ferment, or agitate, than the flowry part on the sides of such piece. Hence I am convinced, that the smaller \* and more broken this marl, the

\* It is in stone marls, partly, as with brimstone in a roll; absorbing substances lose the force of acting when united in a large



the sooner it will benefit the land on which it is laid; and to confirm this truth, we may observe, where the industrious farmer lives contiguous to a marl pit, on whose side a road is frequently used, and takes the precaution of turning the rainy torrent, which brings down with it the dusty, or small particles on his land, finds it much more enriched, than by the marl laid on it in the common way.

Scouring of ditches is a good thing to mix with the dung-hill, it is generally very rich, because all nourishment from the surface of the ground runs into it, and the many leaves which fall into the ditches, add much to its value; but the number of weeds in the hedges, with the dropping seeds, renders it unfit for tillage land; therefore I hope the farmer will apply it to a more proper use.

Sea weed, or ooze, is found in plenty washed up on some of the sea coasts, particularly where the sea is foul and rocky; this is a very fertilizing manure, but more particularly so, when gathered together, the wet drained out of it, and half burned; if too much burned, the ashes will run together like a cinder called kelp, which when ground

to large body; brimstone in a roll absorbing no air, though it does so plentifully when reduced into minute particles.

to powder is used by soap boilers and bleachers of linen; it abounds with salts of a very strong penetrating nature, which makes it so much in use to purge and bring down the rough, stubborn, quality of coarse linen and yarn.

Dung of fowl of all kind is a most powerful operator, particularly pigeons dung, and therefore must be used with caution, and on cold land only, for which no manure is equal: it is generally scattered on the ground with the hand at the last ploughing for wheat. A man who is in possession of a good rookery may turn it to account, by laying on a covering of earth 4 or 5 inches thick, all over the surface of the rookery grove to receive the dung; once a year clear it off, and lay on another coat of earth, and by yearly continuing this method, a large quantity may be preserved, and when laid out on the fallow, it should be well broke and pulverized.

Sheep dung, or penning sheep on fallow is very fertilizing; many people pay by the score for sheep to be penned on their fallow; its advantage being so well known, I shall only remark, that some farmers will not let a night's dung of their flock be lost, if not convenient to put them on a fallow. To preserve it, they keep the sheep at night in an open stable, or some covered place, on earth carried in for that purpose, three or four inches

inches thick ; and so encrease the depth, by renewing the earth in proportion as the sheep may dung on it : this is a piece of frugality worth noticing.

I must here observe an abusive custom, when sheep are penned on a summer fallow, in June and July ; the dung is left on the ground (too often) till the end of September, or October : before it is ploughed in, its fructifying juices are exhaled by the summer heat, and it becomes a mere dried exhausted crumble ; and when ploughed-in afterwards, the ground is little benefited by it. Let any man witness the difference of corn from land under the above circumstances, and from a penning in September when the dung is immediately ploughed in, with its full juice and enriching quality : This leads me to hint, whether the farmer might not find his account in collecting it on the downs, as there are places where the sheep make choice of to lie, and a quantity may, from time to time, be procured at a small expence.

Woolen rags are much used in wet strong land ; they are generally cut small, and scattered on the ground, after the wheat is sown, and then women with a stick thrust them into the ground. Woolen rags are found to be of much service to strong land, by their warm opening quality, and are laid on light land to retain a moisture.

Salt,

Salt, a very penetrating and hot manure, is made use of only where it can be procured cheap; except in the case of destroying the red worm, for which it is worth purchasing at a high price, that and foot being the only quick destroyers of this pernicious enemy to corn; for which purpose, it will take 5 or 6 bushels to an acre statutable measure. This is too large a quantity to be ventured with corn on any soil, at the time of sowing the same; it is most proper therefore to lay it on the summer fallow, if designed for wheat; and on a winter fallow, if designed for oats; but if salt is to be considered as manure, it must be used only on low, heavy, strong land, and sowed on the land with the wheat, and harrowed together, at a quantity of about 3 bushels to an acre.

Lime is another fertilizing manure for cold and strong, either up, or low land, where the texture is closely united. I have known great success from lime on hilly land, and some of such hills very high and steep, the nature of which was very hard, inclinable to a clay, and a shallow staple not worth 6 pence per acre in that state; the lime was

Note. Since writing the above, I have been informed from Dunstable, that they make much use of woollen rags on the dry soils; it appearing to them, that woollen retains a great moisture in such land in the summer.



was carried upwards of twenty miles at the expence 2 s. 6 d. per barrel, or four corn bushels, and 64 barrels allowed to one acre, being 8 l. an acre; and afterwards this land was let at 10 s. per acre, plantation measure, of 21 feet to the perch. Lime will break and open the sullen clod, by its warm expanding quality; and therefore is highly adapted for cold, heavy, strong soils, being in direct opposition to the nature of the land it so reduceth.

Soot is also a warm manure, much impregnated with sulphureous salts and nitrous particles, very pungent for a short time, but not durable; it quickens vegetation, and destroys moss for two or three years, when laid on mossy pasture; it is a good ingredient for a dung hill, or for tillage in heavy land, and an effectual destroyer of the red worm.

Hogs' dung is by every account the first manure among the brutal species; and if hogs' dung, and neats' dung could be preserved pure without mixture of other dung, it would make the best in the world for a light soil. Hogs' dung is very rich and powerful, and if mixed with the cool rich diffusive neats' dung, and covered in the earth, would affect the staple of shallow, dry land, beyond any other: hogs' hair is also very powerful when laid on pasture, or tillage; it is not only proper for heavy land to open the pores there-

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of, but is also of great efficacy on a warm, dry soil in pasture and meadow. I must acknowledge my surprise on seeing the effect it produced, where it had accidentally been laid on a dry side of a hill of pasture land; even the coarse bristles producing a luxuriance scarcely to be credited.

Cows, or neats' dung\*, and neats' hair, are great acquisitions in tillage, pasture, or meadow land. The dung of cows, bullocks, &c. is of a cooling diffusive rich quality; and although on pasture land it is a thin, dried crust, and out of its elementary province, yet, when it is incorporated with earth, no manure can exceed its utility in a dry, hot, sandy land, producing a general moisture and cohesion of parts: whoever therefore is in possession of a slaughter house, is in possession of a treasure, if he has the opportunity of a dry farm under tillage. Blood, hair, and ordure, with all that comes from the inside of a slaughtered bullock, or pig, is an inestimable friend to dry, shallow land, and cannot be too

\* As opposition and caprice is one of the reigning vices, so in no one thing it appears stronger than in the charge laid against neats' dung by some persons: They say, it certainly is a fine, rich, cooling dung for hot land, but it is subject to produce nettles. Had such made use of it in tillage as I have, they certainly would (at least I have the charity to hope) have given all the merit to it that it deserves, nothing being more idly insinuated.

too much prized. Neats' hair from the tanners is of much value, either strewed on pasture, or meadow land, either hot or cold, or when tilled in.

Horn shavings also are a great warmer of land, and have great power in fructifying pasture ground, and are good in a clogged soil under tillage.

\* Malt dust is opening, and keeps the pores of strong land from adhering together; but in itself, as manure, or enriching, it has little power: however, as malt dust will keep the parts of strong land from too great a connection, and thereby accelerate vegetation, every man who has it in his power to obtain it reasonably, should make use of it.

Leaves of trees, and vegetables, are the most permanent of all manures, especially the leaves of trees; they have a rich and lasting quality, and therefore a double advantage ariseth from laying earth over the surface of a rookery grove, as all the leaves of the grove can be thereby preserved; letting the season of taking the earth away be, as soon as the leaves are fallen.

The next and last manure I shall mention is not for tillage, but pasture and meadow only, and that is, horse dung, and the dung hill mixture;

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lay,

\* Four quarters to an acre, sown with the wheat.

lay all such out on the pasture and meadow land to do its office in its province. The chimney sweeper is as useful in his sable office, as the lace coated servant at the side-board. Filthy weeds rotted, and all manner of stuff fermented together in the mixen, are in their proper province as useful as the delicate flowering clover, buck wheat, &c. are in theirs. Therefore, let not the farmer blend inconsistencies, but with propriety conduct his noble science, and maintain his credit: let him not sleep as it were, over that high station in life wherein providence has fixed him; but try every experiment further to improve the first station of universal good: Let not one day be void of proper attention and enquiry, thus will he extend his ideas, and then bring them into the field with judgment and advantage.

Having gone through a course of bringing in land for tillage, and made observations on manures best adapted for the various soils, I shall now make some profitable observations on the artificial grasses most worthy of notice, requesting the farmer's attention, as it nearly concerns his pocket. And first, on red clover:

Red clover is a profitable grass, and may be much more improved if the farmer strictly adheres to the clean system of tillage, and proceeds with judgment upon it.

I left



I left the husbandman in possession of his land, page 19. after one, or two crops of wheat had been taken from it, to proceed with succeeding crops according to his own judgment. I presume that he has strictly observed my advice, in respect of the tillage; and that I now find some of his ground hath been sown with red clover in the spring, accompanied with a crop of barley, and and the land nearly in the same rich state, but in a much higher tith, than when I delivered it to him. Then in July let him sow some turnips on another part of the land, for winter provender for the sheep and oxen, which his rich dunged land is now feeding, as well as for those more profitable oxen that are in the plough; the feeding of which shall be hereafter spoke of.

The spring following, let him buy a parcel of sows with pig, of a kindly breed, in proportion as three sows to an acre, (when I mention an acre it is a statutable acre) and keep them in the farm yard on the refuse of the winter turnips, which they will greedily eat if cut into quarters, or rather boiled and mixed with a little pollard. As soon as the clover is strong enough to receive them, which will be in the beginning of April, put the sows with their litters into the clover, in proportion as three sows and their litters to one acre; which, for a certainty of computation of profit,

profit, I shall suppose 30 sows and litters, to 10 acres: in a warm sheltered corner of the field, make a hovel open on the sides, and only covered with a few furze faggots, and some straw in the bottom, for the pigs to go into and protect themselves from heavy rains. It is not of any consequence, whether the sows farrow in the yard before they are put into the clover, or not, when they have that covering and straw to be sheltered in.

These 10 acres will maintain 30 sows and litters, at 8 to a litter; but I will suppose it only feeds 6 to each litter, the number is 180, exclusive of the sows. What will the farmer sell a score of these pigs for in October? (at which time I suppose the clover may begin to be scarce) I dare say he will ask 15 £ a score for pigs so highly fed; first, from the large quantity of milk the sows were so profusely supplied with in the luxuriant clover, and the full feeding they have been bred up with, without intermission, seven or eight months; and thereby rendered one fourth larger than what they would have been running about in

Note. Pigs were so scarce in the Isle of Wight in the beginning of the winter 1770, that pigs bred up in the common way, at 7 months old, sold for 22 s. and upwards, a-piece: And in January 1771, pigs 2 months old, sold for 11 s. a-piece; and 6 weeks old pigs for 7 s. and 8 s. a-piece.

in the common way. I do not chuse to make words, but will give him 12 £. a score for them, one with another ; and the farmer will have made a hat-full of money in seven months from 10 acres of land : 108 £. for nine score pigs, and the sows worth at least their full cost. Or, as soon as the pigs have done sucking, the sows may be taken away and spayed ; an acre will then feed 6 more small pigs, which will be 30 to one acre of good clover ; and the pen-hurdles being made close at bottom, or with wattles, there will be no danger of their getting out.

A farmer who made trial of penning large pigs on clover, found a difficulty in preventing them heaving up the hurdles ; but if they were rung with a forked ring, or the hurdles made with five bars, the three lower more close than the two upper, and to lie close to the ground, the pigs could not disturb them.

One acre of good clover will maintain 18 large pigs, six or seven months ; and it is as well worth while to keep a hog-herd, as a sheep-herd. Where a man has a hundred large hogs under this manner of feeding, a few short posts set up in different parts of the field, will be necessary for the pigs to rub against.

Now, let us deduct for rent, on 10 acres of land, and the expence of now and then removing  
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the hurdles of division, as two acres or thereabout, will be sufficient at one time, till the pigs are three months old; and then they may have more room, supplying them with water in the heat of summer; all which may amount to about 8*l.* charge: pray in what manner will the farmer make 100*l.* out of any other 10 acres? and at the same time, the 10 acres are really 30*l.* better than when the pigs were put into it.

Hogs' dung has been already spoken of, and therefore I shall not say more in its praise, but desire the farmer to plough the ground for wheat, and sow 64 pounds to an acre.

I should have noted, in a free working good soil, clover seed, or trefoil, may be sown to succeed a crop of wheat, by sowing it the beginning of March on the wheat, allowing a little more to an acre, than is usually sowed. This clover seed may, or may not be trod in and covered, according to the nature of the ground; if it be stiff and moist, the seed will do very well without further trouble; but if sandy, or light, treading the seed in with horses, and rolling it well, will be of much service, and even to the corn; but I hope feeding sheep on it will be excluded. Sowing clover with wheat, may gain a season to the farmer; and if he is desirous to succeed with a crop of barley, his land will be much better for such



such a crop, by plowing in the clover, before his barley is sowed; in either case he loses no time, as a winter fallow must ensue.

The next profitable grass I shall mention, is lucern, which I am sorry to see neglected; it is not inferior to any, if not superior to all, if sowed in well tilled clean land, in the broad cast way, as 7, or 8 pounds weight to an acre, which will be less than 2 inches distance from each plant; and the same soil that suits red clover, will answer to lucern, and it may be sowed with oats or barley. The first year cut it for soil, or mow it twice for hay; if cut for soil it will yield four plentiful cuttings. In the south of France, they cut it 5 or 6 times, it is an encreaser of milk, beyond any other grass; and though the prejudiced and ignorant assert, that it gives butter and milk a bitter, disagreeable taste, I know the contrary from several years experience. Some people also exclaim against turnips for the above reasons; but I assure the reader, I knew a very curious man feed his milch cows in the winter with turnips, and a small quantity of hay, but never heard one complaint of this kind. Indeed, some conceited persons also will tell you, that mutton will taste and smell strong of turnips, when fed on them, but it's all whim and caprice. To proceed: lucern being cut for soil,

or

or mowed for hay, or fed with pigs the first summer, I shall advise to feed pigs on it the next, by which time it will be very stout and early in vegetation; and this vegetation continuing uniformly through the summer, gives it the preference to red clover, for rearing young pigs.

I am convinced it will feed 6 pigs an acre, more than red clover, which makes a difference of 36*l.* on the 10 acres in its favour; this is no despicable sum, nor will lucern ever be neglected by the judicious. After you have fed it two summers with pigs, and put into your pocket 200 *l.* and so much enriched the land, plow up the lucern and sow it with wheat, or, continue to feed it with pigs; either way the farmer will find a large account, and some time or other when at leisure, thank the person who advised him to it.

Many have been kept from cultivating this treasure, supposing it could not be raised in the broad cast like red clover, but must be sowed in drills with a continual trouble of tilling; but I can assure the farmer, he need not be under any such doubts; it will thrive and flourish many years, without any annoyance of weeds or grass, in proper well prepared land; but even suppose it should in a few years lessen, as red clover does in its produce, the land is equally as fit to be plough-  
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ed up for wheat\*, as any clover land ever was; where then is the loss or injury? nay, I must further advance, that if it were only equal to clover, and of as short duration, it would be but prudent in the farmer to change the rotation in grass, as well as in corn. Nor is another story propagated against the culture of this grass, less weak and groundless: that, in order to make it prolific, you must sow it in a nursery way one spring, the next transplant it into rows, and shorten the root to make it throw out more lateral roots; and thus having a less depth in the ground, enlarge the crown or head, from whence the many branches shoot forth. From experience, as well as reason, I know this to be a mistake: as I have known it for 15 years sown in the broad cast, where common grass had formed a close sod, on a dry side of a hill, where the common grass in May, was often entirely parched up; yet, through this would the lucern flourish, so that in the beginning of May, it was generally 20 inches to 2 feet high. As to natural objections, I observe, that this grass as well as red clover and sain foin, has a deep root which will not be affected by the drought, and therefore it will flourish in such weather and soil,

\* Tap rooted grasses not only supply themselves with food, but when ploughed or broke up, the dead roots enriches an under stratum.

foil, when the common, or superficial rooted grasses are languishing and burnt up. Thus we see the deep, or tap-rooted grasses, lucern, red clover, and sain foin, whose roots are perhaps 3 feet or more, flourish, not from any magic virtue in those sorts, but from an easy accountable cause, which the advocates for transplanted lucern directly oppose.

Transplant\* it say they, and cut off the tap root, this will prevent it from rooting deep, and cause many lateral and superficial roots, and thereby add strength to the plant. Pretty reasoning this; deprive nature of that support which it had given to the plant as the only protection against the burning element. I wonder much why these absurd gamblers in vegetation, have not told the farmer his clover would be more prolific if the tap root was taken off; and the gardener, that if he intends to make a flourishing and luxuriant wood of oak, he must sow the acorns, transplant and cut off the tap root, which nature has given to that majestic tree, to support its weighty and extended head.

Sain

\* Execution in labour and industry being like a machine, requires simplicity in the operation, that multiplicity of work may not impede each other. So loading or clogging husbandry with useless labour, is like chaining up one of the wheels of a carriage to facilitate the motion.



Sain foin is another luxuriant grass, and has still a more excelling quality than either, as it will prosper in a more dry and flinty soil, and yield an abundant crop for soil, or hay: it may be sowed in the same manner as the before mentioned sorts. Too much cannot be said for this grass, it is equally fertilizing with buck-wheat if plowed in for manure, and the best hay for sheep in the winter; nor do I doubt but it will answer well to rear pigs on; at least, I most heartily recommend a trial, and if it answers that end, it is easy to conceive what a rich state such poor flinty land may be brought to.

Rye, or ray grass, makes a very coarse hay, but is early for sheep, and at such time the blades are tender and sweet; this is good for low strong land, where the past mentioned luxuriant grasses will not thrive.

Timothy, or the Ohio grass, is of much the same nature, only more strong; it stocks or branches out from the root much more than ray, but is harsher when made into hay; it is always sown in swampy soils, when the water is well taken off the surface.

Trefoil is an exceeding good grass for hay, perhaps the first, considering its sweetness, earliness, produce, and the delicacy of the stalk, and agrees best in a dry soil.

White

White meadow grass is much preferable to ray, or timothy grass, being a more kind and tender hay for common meadows than either.

Having gone through a short account of the most useful grasses, I shall now give some directions by way of improvement of pasture, or meadow land, when the farmer lays out his dung.

Just before the dung is laid out, the land ought to be scored, as it is so called, with a scarificator, a plough made for that purpose, which makes five scores, or cuts, about four inches deep, and three inches from each other, with one horse; each score is just as if a harrow pin had been drawn along the ground. When the dung is spread, much of the small parts of it will enter these cuts; and the nourishing juices will mingle better with the earth, and improve the grass and soil more than when the whole is kept on the surface; which is no sooner wet, but dry again. By this method of scarificating the ground it is otherwise, the scores are receptacles for rain and moisture, and are as so many small ditches to receive and hold whatever runs into them; I must acknowledge, that I think it carries its merit with it on a bare idea, but I am sure when the farmer puts it in practice, he will be convinced of its utility equal with the writer; and when sloping fields are to be scored,

scored, or scarificated, it must be cross ways, not up and down.

Thus, having gone through a short account of manures, I shall take the liberty to give the farmer the opinion of some writers relative to frost and snow, so far as it may appear to fall in with winter manure. Frost being only an excessive cold state of the weather, whereby the motion and fluidity of liquors are suspended, is therefore not acknowledged by any writer, as having any fructifying quality, but is of service only, as it opens the earth, and thereby admits the air to enter and pulverize the ground, and as it dries heavy, wet land, when it continues any time without rain.

Snow is mentioned by some, as containing abundance of fructifying salts; and, on very mistaken principles, is accounted a blessing to the farmer, when plenty in the winter. Snow says the learned, is a vaporous meteor, formed in the middle regions of the air, raised by the action of the sun, or subterraneous fire; there congealed, its parts constipated, its specific gravity increased, and thus returned to the earth in little villi or flakes.

In plain terms, snow is nothing more than rain congealed in part of the atmosphere through which it falls; and if part of the atmosphere is warm enough to dissolve the snow before it arrives

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at us, we call it rain; if it preserves itself undissolved, we call it snow.

The ingenious gardener, Mr. Miller, says, like many others, snow is useful; that it fructifies the ground, guards corn and other vegetables from the intenser cold of the air, especially the piercing winds. That it abounds with salific and fertile particles, as much, or more than rain; however, it is accounted more ponderous, and by that means sinks deeper into the ground than rain.

Chambers, in his *Universal Dictionary*, after giving us the philosophical definition, comes to the uses of snow, and furnishes us with a sufficiently curious account of them. If all be true, says he, which Bartholin has said in its behalf, the uses must be very great, as it fructifies the earth, preserves from the plague, cures fevers, cholics, tooth-aches, sore eyes, and plurifies, for which his countrymen of Denmark used to keep snow-water gathered in March. He adds, that it contributes to the prolongation of life, giving instances of people in the Alpine mountains, that live to great ages, and to the preserving of dead bodies: instances whereof he gives in persons buried under the snow in passing the Alps, which are found uncorrupted in the summer, when the snow is melted.

He



He observes, that in Norway, snow-water is not only their sole drink in the winter, but snow even serves for food; people having been known to live several days without any other sustenance. Indeed the generality of these medicinal effects of snow, are not to be ascribed to any specific virtue in it, but to other causes. It fructifies the ground for instance, by guarding the corn and other vegetables, from the intenser cold of the air, especially the cold piercing winds. And it preserves dead bodies by constipating and binding up the parts, and thus preventing all such fermentations, or internal conflicts of their particles, as would produce putrefaction.

Be these accounts founded in truth, either in part, or the whole, nothing arises from them to convince us, that snow has any intrinsic fructifying quality; and I am sure the doctrine of a modern writer is exceedingly absurd, who has ascribed such virtue to it. He advises a constant attention to keep dung-hills covered with it thro' the winter, by throwing up a large quantity on them, whenever it falls. Snow has a ponderous property, and therefore worse for low ground than rain, and if it did not cover and protect the corn from piercing winds, it would be injurious to such land: it has no more salific, or fertile particles

particles than rain; and, at best, can be considered only as a protector of vegetables.

Thus, have I endeavoured faithfully to answer my engagement of increasing the farmer's purse, and improving his land, in an easier manner than what he had been accustomed to. I shall now beg the farmer's leave to depart a little from the trodden path once more, and offer some observations and hints, towards a further improvement in a new road of husbandry, at least unknown to many, who may be readers of this treatise: and should he refuse to try it even in small experiments, it will not hurt him to read the process: the same principles which first actuated my pen, continue to make it flow.

I told the farmer, land was very obedient if judiciously treated, and the more care he took of it, the more gratitude he would receive from its flowing veins. I left it in his possession in good order, just as he had taken one or two crops of wheat from the new broke up land, page 19. I will resume the subject at the same place, and wish him to attend to the profit on the method he has pursued since I put it into his hands, and what I now shall offer to him.

As soon as the crop of wheat is cleared from the field, roll it on the stubble, when it is dry, with a spike roller; this will break up and divide the surface

surface which has laid hardening from many circumstances since the last wheat was sown, and therefore the top must be much harder than the bottom; and as this hard top, or surface, is to be undermost in the next plowing for winter fallow, it will be necessary for the good of the tilth, that this should not be turned over to lie in that clogged hard state: the spike roller you see will prevent that, as it separates the parts before the plough turns the ground over; the whole then lying in a loose open state, the wet of the winter is more freely discharged. It being now ploughed and under a winter fallow, sow it with barley and clover, the ensuing spring, 1770, from which time my calculation begins; feed it with 180 young pigs and 30 sows. The next season sow it with wheat, after which give the land a winter fallow, and sow it in the spring 1772 with barley and lucern. In April 1773, feed the lucern with 240 pigs and 30 sows, as lucern will feed 30 sows and 8 pigs to each litter on 10 acres; and so proceed for 10 years according to my calculation, or as much longer as you please. With this alternate rotation, you may continue till your pockets overwhelm with wealth, as your land will with richness.

As under, the whole process is stated for 10 years, on 10 acres, as near to a computation as it can admit; beginning with 1770.

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A cal;

*A calculation on 10 acres for 10 years.*

Clover fed with 180 young pigs and 30 sows, at 12s. each, from April to October 1770, 6 months.	—	—	108
Wheat from October 1770, to August 1771, 10 months.	—	—	100
Fallow from August 1771, to April 1772, 8 months.			
Barley and lucern from April to August 1772, 4 months.	—	—	50
Lucern under the winter from August 1772, to April 1773.			
Lucern under 240 pigs and 30 sows from April to October 1773, 6 months	—		144
Lucern under the winter from October 1773, to April 1774.			
Lucern under 240 pigs and 30 sows, from April to October 1774, 6 months.	—		144
Lucern under the winter from October 1774, to April 1775.			
Lucern under 240 pigs and 30 sows, from April to October 1775, 6 months.	—		144
Wheat from October 1775, to August 1776, 10 months.	—	—	100
Fallow from August 1776, to April 1777.			

Carried forwards.

£ 790

Brought



	£.
Brought forward.	790
Barly and sain foin from April to August 1777, 4 months.	50
Sain foin under winter from August 1777, to April 1778.	
Sain foin under 240 pigs and 30 sows, from April to October 1778, 6 months.	144
Sain foin under the winter from October 1778 to April 1779.	
Sain foin under 240 pigs and 30 sows, from April to October 1779.	144
Wheat from October 1779, to August 1780, 10 months.	100
Or on 100 acres in one year.	<u>£ 1228</u>
Or on 100 acres for 10 years,	<u>£ 12280</u>
Profit on 100 acres in 10 years,	<u>£ 12280—00</u>
Deduct expences as hereafter allowed,	<u>1203—05</u>
Neat profit from the land.	<u>£ 11076—15</u>

By the above calculation the amount of 10 years process is 12 l. 5 s. 7 d. yearly on each acre, and that with the least expence; and not only 10 years, but ten times ten will hold under the same rule. Now let the farmer give us his manner of tillage, and state his profits: if the expence be less,

less, profit greater, and the land made more fertile, I will most gladly submit, and commend his adherence to the good old path; but if it does not appear so, my observations hold good. And I would add for his further comfort, that I sincerely believe near 1500*l.* might be made by the above process, instead of 1228*l.*

However, I have not quite done with my new path, or more properly a broad turnpike road, smooth and easy to travel on, and room for wag-gons to bring home the treasure. Let the farmer have done with the expensive horse, and cherish the profitable ox. The accidents, maintenance, shoeing, and decay of horses, are heavy articles; whereas, the maintenance of the ox is easy, the expence of shoeing him small, even when the ground is stoney; and if an accident attends him, he is not lost; moreover, every day of duty en-creases his value till he can labour no more. Hence I may say, the comparison will be as a dead horse to a living ox.

In the course of this treatise, I have informed the husbandman how he may make a poor farm rich, or any part of a farm not naturally equal with others, by bringing in such with vegetable manure, so as to make it fit to produce clover, lucern, or sain foin; which when done, the pigs afterwards are the treasure to enrich the land to almost

almost any high state; and when arrived to this perfection, the past calculations may serve for his conduct; or if he will be obstinate, and, like an owl, be blind in the midst of light, he must not complain, or repine at providence.—I shall now make a few profitable remarks on some things I have mentioned. And first, encourage pasture with your dung; I know many are bound up from ploughing pasture, which if prudently done, and laid down again after a few crops, would make such pasture double its value: and therefore, the farmer is to make the most of it in its natural state, and enrich it for his own sake as much as he can with dung; by this he will be enabled to rear more calves, and make an additional profit.

Secondly, keep no more land under tillage than you can properly attend; 100 acres on my system will produce, in gross, a sum not less than 1228*l.* each year, page 55. or 12280*l.* in 10 years. The expence of tilling this 100 acres, is but very small, as are also the harvestings, which for satisfaction, shall be explained. In the 10 years process there are 5 plowings of the whole land; that is, 3 of wheat, and 2 of barley, and the same harvests, and 6 summers under pigs. I do not mean to stint a farmer to 100 acres only, under this process the more he has, the greater will be  
his

his profit; but I mean, that no man should so encumber himself, from a desire of being the great farmer, as to become a sloven over any part of the land which he occupies; and which, so far as neglected, must from its expences be a real loss to him.

I have mentioned what you should do with your dung and its use, but I do not lay it down as a rule for the farmer to go into a grazing system; for tillage land, and grazing land, are two distinct and opposite farms: a grazing farm, and a corn farm, are very seldom united, each being a distinct province. I mean, however, that on his pasture he should raise calves for the graziers, their land is too valuable to rear young cattle on, they go abroad, and buy at the fairs 2 and 3 year old bullocks, &c. and then swell them up on their strong pastures, which are natural and not made so by art. In order to render your pasture land more fit for the purpose intended in the summer for young cattle, I have recommended the use of dung; I shall now tell the farmer what he is to do in the winter to advance this young stock, so as to make it as profitable (with his industry) as may be.

In part of the farm I advise him to have turnips for his sheep, or rather turnip rooted cabbage, it being of a more solid substance than turnips; and it is much remarked by those who have used it,  
that



that the dung from black cattle (as all cows and bullocks are called) is of a firmer consistence than what is produced from turnips, and therefore the nourishment of this food is accounted greater. This may be sowed in well tilled ground in April, 3 pounds weight to 1 acre, hoed as turnips are hoed, and according to the goodness of the ground set off from 10 to 12 inches square at least, each acre will produce 43560 plants, at 12 inches square, and at 6 pounds weight one with another, is 261360 pounds weight; or 116 tons, 13 hundreds and 64 pounds. Each of the 2 and 3 years old bullocks, or heifers, in the field will eat about 120 pounds in 24 hours, carried on pasture and properly cut into pieces; so that 1 acre will maintain 15 in the field 5 months, that is, through November to the 1st of April. If these store fed cattle should be kept in the farm yard, or any where that straw may be given to them in cribs, 84 pounds weight of turnip rooted cabbage, and 40 pounds of dray straw, is as much as each can eat, which will feed 20 in the 5 months: and where milch cows are fed in this manner in the winter, it is the full allowance. Stall fed bullocks for fattening, have an allowance of half their weight every 24 hours given them of the above food; for instance, if a bullock weighs 600 weight, he will eat near 300 weight of such food;

1 acre

1 acre will feed 7 bullocks of that weight 5 months. Sheep will consume from 15 to 20 pounds weight according to their size in 24 hours, so that 1 acre will maintain from 81 to 124 sheep 5 months. In much the same proportion of turnip rooted cabbage will bullocks and sheep eat of turnips. The working oxen, in their rest after labour, will eat full as much as the store cattle; for although they have but less time, yet they eat more voraciously.

Turnip rooted cabbage being not much known, I shall therefore describe it. The root which is the principle food, grows entirely out of the ground, rather oblong upwards, than flat like turnips on the ground, and only a long root into the ground for its support; on which account it is clean and free from earth, which turnips often are not: the cabbage part does not gather together into a closeness like cabbages, it is called so from the leaf resembling a cabbage leaf, but it is as good food as the tops of turnips: the root is not of so watery a quality as turnips, and it is a general remark, that cattle fed with this root, dung more, and make less urine than those fed on turnips. Moreover, if sheep in the field eat but part of one at a time, the remainder does not decay and rot as the turnips do: they will also keep perfectly good and sound till the end of May if the tops are cut off close,

close, and the turnip part thrown together in heaps; and be equally good in May, as in March: the cattle are also as desirous to eat the tops as they are turnip tops; some say, much more so, because they are of a much smoother and sappier substance: my calculations are from the root being divested of the slender part which runs into the ground, as also of the tops, or leaves: the leaves are to be given to the cattle by themselves.

The manner of giving turnip rooted cabbage, or the common turnips, to black cattle, or pigs, is to cut them into quarters, four or eight, according to the size of the root; but if cut too small they may swallow the piece whole, and endanger a choaking: and where these roots, either one or the other, are given to black cattle, the farmer generally has a quantity brought home, and the servants cut them in the kitchen at night with a knife, unless provided with a machine constructed for that purpose.

The great advantage of feeding black cattle with either sort, is the enlarging and swelling them in size; in which it has indeed a good effect, and is much cheaper than hay: I think the first idea of it carries a conviction to every man, who acts on impartial principles, as every one is perfectly and experimentally convinced what effect vegetables have on cattle; and how much to  
I
their

their well being it must be, that during the locked up face of the earth, where there is no vegetation of grass, or common nature in the field for their support, but kept alive only as I may say with dry harsh straw, or hay, (and if good, I am afraid they get but little of the latter) they have then the nourishing vegetable to keep them in a prominent state all the winter, that they may extend themselves in a proportionable degree in the summer. I have before observed to you, in the case of manure, where one part of the country perhaps had not such as other parts of the country possessed, that there was manure suitable to improve their land within itself, if they would look for it; as providence has kindly furnished a substitute for man's comfort: so here, when all the summer's luxuriance of clover, lucern, sain foin, &c. is gone, and dead as it were, no more to be found for the mooing cow, or the bleating sheep, providence has given other living vegetables, and substituted as it were a new frame of support, which inclemency of weather cannot destroy: such vegetables are the turnip rooted cabbage, the common, or field turnip, burnet the small or garden kind, and the cabbage species of different sorts.

As to pease and oats, neither of which has been mentioned, I shall leave them to the farmer's own thoughts;



thoughts; if he can turn the land to more profit by sowing either, it is adviseable he should do so; but I hope he will not sow oats for horses, if he sows pease for fattening his pigs; his oxen will not require such expensive food, their support is much cheaper and better adapted.

Thus, I have given a short account of tillage; some hints perhaps may be useful to some persons, and the whole may be a general hint to others to improve on; for we must not mistake the meaning of Solomon, where he says, "there is nothing new under the sun," that being metaphysically spoke relative to the knowledge of God: short sighted man is always seeing, but can never see; always learning but never learned.

Before I quit the field, I shall offer an observation or two on the sowing wheat in the spring, and oats in October, or November: strict attention should be had to the following rules. If land is wet and heavy, it ought never to be ploughed, or sowed in wet weather, or at any other time ploughed in wet weather, or when it is in itself wet: such land should be ploughed when dry, and lay till the season for sowing the wheat: it may be ploughed in August, and left in the rough till the beginning of October, and then sown and harrowed. If this was observed, the farmer would always sow such land in due season, and in  
ground

ground proper to receive the seed ; if on the contrary, part of the land be hot and dry, I would not sow it till October, or November, and so do the work on the heavy wet land first.

And here let me mark the impropriety of eating down wheat with sheep ; for be assured if wheat be not sown too thick, it will not be too forward, having room to stock and spread, which many instances have proved ; some tell us 6 grains put in at one foot distance, produced 174 ears, containing 5710 grains, which, from the size of wheat, weighed 10 ounces : others affirm they have had 41 ears from one grain, each ear 7 inches long, and 100 grains in each ear, 6 ounces from one grain. However large these accounts may be, I am very certain a much greater encrease, and finer wheat may be produced by due attention to tillage.

Further, as to seasons of sowing wheat, the farmer should not despair if his wheat-land has not all been sown in the usual course of time, as he may sow even through February ; many good crops have been obtained from such sowing.

As to oats, particularly black oats, I am satisfied, from many experiments, they ought to be sown in November in dry land ; as they are equally hardy with wheat to resist the winter, and then will never suffer from an ensuing dry summer.

Drill

Drill tillage is a very agreeable amúsement, and answers in some fine soils, but I am very doubtful from what I have heard, even from the advocates for this tillage, that it will not profit the farmer ; if it does not, it is of no utility to trouble him with it : my aim is to point to the centre ; to this uncontroverted system, whereby a man shall most improve his land in the cheapest manner, enrich himself, and go smiling to his landlord ; any other system of agriculture is mere wind.

Having mentioned some other vegetable winter food for black cattle, such as burnet, and some cabbage kind, some account of them may be expected.

Burnet is an old standard in the garden for cool tankards, as giving the liquor a flavour, and thought to be good for the head ; there are two sorts which naturally grow in England ; the one is found wild on the sides of many dry hills, where it is but a small plant, but when brought into the garden, or field culture, it grows to a large crown, or head, and produceth a great number of leaves, which grow, or adhere to the stalks by pairs, therefore called *Pimpinella* for *Bipinella* : The other, or wild meadow burnet, does not claim our attention : but the first is much in vogue : it was accidentally introduced into field culture,

culture, by a premium of fifty guineas, offered by the Society of Arts and Manufactures, to the person who should discover a grass that vegetated in the winter : a gardener near London presented this burnet as a vegetating winter grass, and obtained the premium : since which many persons have run burnet-mad, as supposing it to have been endowed with some supernatural property to vegetate in the winter, as in the summer ; but this is mere partiality, or mistake, there being in all herbs, some degree of vegetation : burnet however, being strong before the winter, defies the most severe seasons, and is in February and March a fine crop, though of little use in the summer feeding for heavy cattle ; as the head, or crown, from which the many leaves shoot, stand above ground so high as to be broken and bruised by their feet : it is propagated in a manner of tillage, so as to make it respectable, by sowing it in drills at 2 feet distance in good ground, and kept free from weeds with the one horse plough-hoe, then cut and given to the cattle in the stalls. In less grassy dry ground, its vegetation in the summer is nothing to clover, &c. and in the winter, from November to April, not half equal in use to the common field turnip, or turnip rooted cabbage.

The other sorts of winter vegetables are the cabbage species, of which two only are worth mentioning,



mentioning, the large Dutch cabbage, and large curled leaf Scotch kale, or as some call it the Siberian Borecole.

They are sown in autumn, and having a rich well tilled piece of ground ready in March following, the plants should be set in rows 4 feet apart, the plants 2 feet distant in the rows, which will be 32 plants to each square perch: thus, one acre will take 5120 plants, and allowing 10 pounds one with another, produce 51200 pounds weight, or 22 tons, 17 hundreds, and 16 pounds.

Mr. Baker, who has been curious in experiments, finds a bullock of 5 C. weight will eat about 168 pounds of cabbage in 24 hours; in this proportion one acre of large Dutch cabbage will maintain only 5 bullocks 61 days, (far unequal to turnip or turnip rooted cabbage) and for this poor service an acre is occupied a twelve month, and has three plough hoeings in the summer, or two ploughings with the cultivator.

The other sort is the Scotch curled leaf kale, or Siberian borecole. This must be ploughed in the same manner, or horse-hoed as the Dutch cabbage: it does not cabbage as the other sort, but grows to a prodigious head of large curled leaves,

Note. For spring use, no vegetable is equal to Scotch kale, either for the table, or the flock.

leaves, and stands the severest winter without being injured; it has been much used for feeding of black cattle, or sheep in the winter, but will not produce more advantage than the Dutch cabbage: and indeed I see not any room to recommend either, preferable to the before-mentioned profitable turnip kinds, unless for spring use.

I shall now trouble the farmer with a few observations on the broad cast, or common, and the drill tillage.

If in the latter, wheat planted, or the seeds drilled in with the drill plough, 6 inches distance in the row, and at one foot distance row from row, will take 33 seeds in one perch in length, and 33 seeds in two perches breadth, 1089 grains of wheat to two perches of ground, near one ounce and nine drams of wheat, produce a given quantity: there is not the least doubt but wheat evenly sowed in the broad cast, at 6 inches square, which will take double the quantity of grains, viz. 2178 to two perches, being in weight nearly three ounces and two drams, will produce a double quantity of wheat: no material advantage arises by fixing a distance between the plants beyond a necessary space, which the drill plough introduceth; on the contrary, if wheat is sowed too thick, it will not yield the proper produce: so that from one extreme the dissidents often run into another, it was absolutely necessary

to make a reform in the mode of quantity, but such should be regulated by experience and reason; where man will not make use of such he must continue in darkness; if he happens to be right, so far it is well: but he is still in darkness respecting the cause.

The quantity of wheat to sow one acre in the above-mentioned drill system, amounts to 87120 grains, or 7 pounds 12 ounces and an half; and if that acre had been sown in the broad cast at 6 inches distance, the quantity of seed would have been 174240 grains, equal to 15 pounds 9 ounces; so for the saving of 7 pounds 12 ounces of seed, you lose half the produce. This is bad conduct on the one hand, as is the common method on the other of sowing 128 pounds, and receiving but a poor crop, instead of sowing 64 pounds weight: which saves one bushel of seed per acre, and gives one fourth more of profit.—The following original table will give the husbandman some idea in respect to quantity and distance, whereby he will be enabled to judge of my advice, and the conduct he is to pursue.

**K**

**A TABLE**

A TABLE of the quantity of wheat it will take to sow one acre, from 1 inch square in distance of grain to 12 inches.

Square inches.	Quantity of wheat.			No. of grains.
	lbs.	ozs.	drs.	
1	560	00	14	6272640
1 and half	255	02	10	2787840
2	140	00	03	1568160
2 and half	89	09	11	1003620
3	62	03	10	696960
4	35	00	00	392040
5	22	06	07	250905
6	15	09	00	174240
7	10	14	03	128103
8	8	12	00	98008
9	6	14	10	77440
10	5	09	02	62726
11	4	10	00	51840
12	3	14	03	43560

I have allowed 700 grains of wheat to 1 ounce in the past table, as being a medium between 600 grains to 1 ounce superfine wheat, and 800 grains in common wheat.

Here the farmer may at once see, according to the quantity he sows, if evenly divided, what distance his plants of wheat will be from each other, if the grains are sown; for instance, if he sows 560 pounds to one acre, the plants will be at one inch distance; if he sows 62 pounds to one acre, his plants will be 3 inches square from each other, which I am inclinable to think is not so good a distance in well rich tilled land as 4 inches; being convinced, if a field of wheat was in the same state



state of stocking out from the root, as two plants are, which seed I put into undunged ground this spring on the 10th of April 1769, they must be much enlarged even at 5 inches distance; but as I have observed, the quantity must be guided by the quality of the ground, so no exact quantity can be mentioned; and I conclude with requesting the reader to prepare his land in such a manner, as never to sow more than 64 pounds of the purest wheat, or less than 35 pounds.

Permit me a few remarks on the whole.

Never plough wet land in wet weather, much less harrow in such, or when it is wet in itself.

In all manuring, oppose heavy to light and light to heavy.

Sow your corn in dry weather.

Make your tilled ground rich with vegetable manure, avoiding dung.

Enrich your pastures with dung, that the bullocks hides may be loose on the flesh, and the hair lie smooth.

Instead of the expensive horse, take the profitable ox for your plough.

Rear strong food on your clover, &c. for the poor of the land, and fill your chest with treasure.

Plough deep by degrees, and manure as you deepen.

Sow

Sow wheat early both in wet and dry land, for fear you should not sow the wet land at all; and to establish your corn in the dry ground.

Never put off till to-morrow, things that can be done well to-day.

Sow sparingly, that you may reap plentifully; and till no more land than you can till well.

I shall now give the farmer a recipe for bringing his wheat, to prevent smut, as we have it in *Chambers*.

“ Mr. *Bradley* makes no doubt to call smut a  
 “ blight, and to account for it on the same prin-  
 “ ciples as the blights befalling other plants, par-  
 “ ticularly fruit trees, viz. from innumerable lit-  
 “ tle insects brought, or at least hatched by the  
 “ eastern winds, prey on and devour the native  
 “ juices of the corn, and poison them with a  
 “ mixture of their own.

“ An approved method to prevent the smut,  
 “ Mr. *Bradley* gives us as follows; the wheat  
 “ for seed, to be washed in three, or four waters,  
 “ stirring it well round, and with great force  
 “ each time, and skimming off all the light  
 “ wheat swimming at top. This done, it is to  
 “ be steeped in a liquor thus prepared: into a  
 “ sufficient quantity of water, put as much salt  
 “ as will, when stirred about, make an egg  
 “ swim, and to this add as much more salt; stir  
 the

“ the whole well, and to the brine put two or  
 “ three pounds of allum beaten fine. In this  
 “ mixture, lay the wheat to steep, at least 30  
 “ or 40 hours; take it out the night before it is  
 “ to be sown, and sift some flaked lime on it;  
 “ this dries and fits it for sowing. Note, many  
 “ steep their wheat in brine, and yet have smutty  
 “ corn: the reason is, that they do not make their  
 “ brine strong enough, or do not let their wheat  
 “ stay long enough therein. It is a common no-  
 “ tion among them, that steeping it so long,  
 “ rots the grain; but experience shews the con-  
 “ trary.

Mr. *Mortimer* observes, a consumption, as he  
 terms it, is often the cause of blights, proceeding  
 from the failure of the nourishing juices, or from  
 obstructions of the veins and roots; or ill diges-  
 tion of humours, &c. as also mildews, a kind of  
 epidemical disease, most frequent and fatal in the  
 spring season. It is properly a corrosive and nip-  
 ping dew, proceeding from pent up vapours now  
 exhaled, and returned back on the tender plant.  
 A thick fog says another author, or too much  
 dew, occasions the same disease as a mildew, only  
 in a less degree.

Mr. *Miller* says, blights more frequently hap-  
 pen in close plantations, where the stagnating va-  
 pours

pours from the earth, and plentiful perspirations from trees in an orchard, are pent in ; for want of a free air to dissipate and dispel them. This more frequently happens, says he, in such close plantations, than those that are planted at a greater distance, or one not surrounded with hills or woods. This directs us, says he, in the first planting of orchards, &c. that we should allow a greater distance between the trees, and make choice of clear, healthy situations, that the air may freely pass between the trees to dissipate those vapours before they are formed into large volumes, whereby the circumambient air will be free and clear.

Several remarks arise from a view of these accounts.

Mr. *Bradley* we see positively insinuates that his steep is an effectual preventive of smut, as he takes it for granted it would not fail, if made sufficiently strong, and the wheat to stay long enough in it. How far such steeping may be a necessary precaution I will not absolutely pronounce, but propose my sentiments with candour. He is undoubtedly right in not suffering any light immature wheat, to be in the seed bag, and I think also a steep of wheat, impregnated with brine, with a surrounding lime as a manure carried with each grain into the ground, will forward vegetation at the first on-set ; but I have no idea of its effects



effects continuing to prevent blights, or ripen the grain. The like doctrine has been advanced, relative to the preservation of turnips from the fly, when the plant is young, by steeping turnip seed 24 hours in a strong infusion of sulphur; that the seed would be so impregnated with the sulphur, as to carry its imbibement into the leaf: this comes within comprehension, yet it has no effect; I have experienced the contrary, and conclude from clear analogy, that the impregnated steep is as void, so far as it relates to smut in wheat.

Mr. Mortimer's way of accounting has some foundation; where substance is wanting to invigorate and nourish the juices, (as I have observed on shattered constitutions) heavy dews and fogs catch hold of the depressed plant, and so form a real disease, justly called epidemical. I need only remind the farmer to reflect on many such causes, which must be fresh to him in the course of his labours: how often are turnips in poor ground infected, when pretty large in the summer; not with a turnip fly, but with a little green fly. Caterpillars also lay hold of weak fruit trees, and a worm and fly on cabbages in poor ground, much more so than on the robust and strong.

On the whole, Mr. Miller appears the clearest on this question, and I am happy in the agreement

ment of my own observations, with his very rational ideas of the cause of blights. Where foul air is shut up and stagnated, the tender ear is seized with the acid vapour, and the delicate blossoms are cruelly pierced with it; hence arises the disorder of smut in wheat. There is a perfect analogy in animal and vegetable life, as the lungs of man are the vehicle of breathing; and according to the purity of air, so much more or less will he be in health. So the life of vegetables depends entirely on imbibing and transpiring, which are uniformly carried on as the motion of the lungs; and the plant is affected by imbibing foul air, as man by breathing such in through the passage of the lungs; equal also is the transpiration in plants, with the out breathings of man: being stopped, a dissolution follows. Suppose a number of men shut up in a small room, without any reasonable supply of fresh air, how long could they live under that circumstance? The viscid air would soon clog the lungs, and introduce disorder and death.

Therefore give your corn room to grow, let the air have freedom to each straw and leaf, which will swell more or less, according as it has more or less of this only and original support of vegetation and life: too thick corn carries its sentence with it, and we need not look out and search for causes,

causes, when we carry it in our hand, in the distribution of the seed.

*The expences attending ploughing, &c. of 100 acres for 10 years, as mentioned page 55.*

	£.	s.	d.
Rent of 1000 acres at 15s. per acre. —	750	00	00
For ploughing 500 acres at 7s. 6d. per acre. —	187	10	00
For 19 loads and 13 bushels of seed wheat, at 84 pounds to each acre, 300 acres at 10l. per load. —	93	05	00
For seed barley for 200 acres, 4 bushels to one acre, at 20s. per quarter. —	50	00	00
For reaping 300 acres of wheat and binding at 6s. 6d. —	97	10	00
For mowing 200 acres of barley and cocking it at 2s. 6d. —	25	00	00
	<hr/>		
	£	1203	05—00
	<hr/>		

Note, If the true quantity of wheat is only sowed, there will be a saving of twenty pounds weight to one acre, or 2 loads, 13 bushels, on 300 acres.

Thus far I hope our observations agree with the character of the *Rational Farmer*, proceeding on experience, and consulting his interest: an in-

terest, while connected with the social virtues, which he cannot be too assiduous to cultivate. While many occupations tend only to useless splendor, or lazy pride, the farmer, in every instance of his diligent employment, is a public benefactor, and confirms the truth "Self love and social are the same."

In this view I still trouble him with my remarks, only asking pardon for inaccuracies in their arrangement.

Rolling turnips, frequently after the dew has fallen, preventeth the flies from injuring them, as they are then out on their feed from under the clods, where they protect themselves in the day; being thereby disturbed and many destroyed in the rolling. This account I received from a gentleman, who often saved his turnips after he had observed that the fly had begun on them.

I must also mention a very interesting circumstance, which a reputable farmer in the Isle of Wight communicated to me this spring 1769: he had wheat on a dry, light soil; during the winter he saw his wheat decaying: on searching the ground, he found many small white worms, with a red head, about three quarters of an inch long, and the size of a common knitting needle: these worms, during the winter and spring, had so destroyed the wheat, that in March the plants were  
reduced



reduced to a thinness, from 8 to 12 inches or more distance from each other. The farmer at this time put 4 horses (2 a breast) into a roller, and rolled and trod the ground as evenly over as the horses could tread it: this he did to make the light ground as hard and compact as he could: in this situation he left it to take its chance. When the wheat was ripe, to his great surprize he found that it had stocked uncommonly, and by the extraordinary goodness of the crop, he had a load to an acre.

From this authentic account, I shall observe from what a small quantity of seed a load was produced. I call it a small quantity of seed, not the quantity sowed, but the quantity only that escaped the desolation, which is the true one. You will scarcely believe that this produce arose from between 6 and 7 pounds of seed: by the farmer's account of distance, it could not take more than 6 pounds, as wheat at the distance of 9 inches square, will not take 7 pounds of wheat to one acre, see the table, page 70.

The same farmer told me, that in the year 1767 a neighbour of his was equally a sufferer from worm destruction in the same sort of land, during the winter and spring: about the beginning of March, a parcel of cows were put into the wheat, and drove over it to tread it close and firm, which  
stopped

stopped the progress of the worm ; and it had the same good effect as to the produce and fineness of wheat ; the wheat being so remarkably fine and large, that it yielded but 600 grains to one ounce, the true standard for the purest wheat. Very little wheat is to be found where fewer grains go to one ounce ; some run 800 grains, so that 700 are allowed as a medium number.

Another farmer told me the same fatality happened to him, and he was in great doubt whether to let it stand, or plough it up for spring corn ; but seeing it begin to stock in March, he determined to see the consequence, and like my other friend, found an abounding crop when it was ripe : he apprehended it might be in thickness as half a bushel of seed to an acre, with a produce of 12 quarters and 3 bushels to 2 acres\*.

Other farmers observe, that on the head-lands of their light soil, they have generally the best wheat, and suppose it proceeds from the firmness of that part, being made so much more compact and solid by the frequent turnings of the horses in ploughing.

Hence these accidental discoveries may be of infinite use in two respects. One of them as an instruction how to treat light land, for, or under wheat ;

\* One load, 9 bushels and a half per acre, Winchester measure.

wheat; the other to sow sparingly, whereby a saving of seed equal to half the rent of the land may be put into the farmer's pocket. The first account is a saving of 237 bushels of seed wheat in 100 acres; and the other account is 200 bushels saved in 100 acres; as the common quantity sown is two bushels and a half to one acre.

This is a very material consideration, and I hope will serve to strengthen what has been so earnestly recommended in the former part of this treatise.

It is advised by some to harrow barley after a rain, when the barley is come, or coming through the ground; as it pulveriseth the earth's surface, and assists it with a finer earth to root in.

A few directions follow to ascertain the specific goodness of wheat.

Six hundred grains of wheat to one ounce being prime wheat, and 800 the worst sort, a man may, by weighing one quarter of an ounce, count these grains, and 4 times their number is the quantity. Thus, 150 grains to one quarter of an ounce, are 600 to one ounce, for prime wheat; 175 grains to one quarter of an ounce, will shew him that such wheat is, a middling wheat, or 700 grains to one ounce; and 200 grains to one quarter of an ounce, shews him that such is the worst sort of merchantable

merchantable wheat; and in value no more than 6 to 8.

From hence I shall give the farmer 4 calculations, whereby he may be satisfied of the goodness of his wheat, two of which are a proportion of supposed value, according to the grains in one ounce. And the other two, nearly the true value according to the produce of flour, allowing for increase of bran, according to the diminution of wheat in goodness; prime wheat being at 10 *l.* per load.

The proportion between prime wheat and the middle wheat, will then stand thus:

*l.*                      *l.*   *s.*   *d.*

7 : 10 : : 6 : 8: 11: 5, The supposed value for middle wheat.

Again,

*l.*                      *l.*   *s.*

8 : 10 : : 6 : 7: 10, The supposed value for bad wheat.

But the true value nearly, are the under proportions, allowing for increase of bran, according to the decrease of goodness; and are nearly as seven and a half to six in the middle wheat, and as nine to six nearly in the worst wheat thus:

*l.*                      *l.*

7. 5. : 10 : : 6 : 8, The true value of middle wheat.

Again,



Again,

$\begin{array}{c} \text{£.} \\ 9 : 10 : : 6 : 6 : 13 : 4, \end{array}$  The true value of  
bad wheat.

I shall figure one sum in each, which will be a  
guide for every other calculation, according to the  
price which the best wheat may bear. As 700  
grains to one ounce the middle wheat, is to 10  $\text{£}$ .  
the value of the best wheat: so are 600 grains the  
number in one ounce of the best wheat, to 8  $\text{£}$ .  
11  $\text{s}$ . 5  $\text{d}$ .

$\begin{array}{c} \text{£.} \\ 7 : 10 : : 6 : \end{array}$

$\begin{array}{c} 6 \\ - \text{£. s. d.} \\ 7)60(8 : 11 : 5, \end{array}$  The supposed value.

56

—

4

20

—  $\text{s}$ .

7)80(11

77

—

3

12

—  $\text{d}$ .

7)36(5

35

1 Remaining, which is the seventh part  
of a penny over.

Again,

Again,

For the true value of middle wheat.

$$\begin{array}{r}
 \text{£.} \\
 7. 5. : 10 : : 6 : \\
 \quad \quad 6 \\
 \quad \quad - \quad \text{£.} \\
 7. 50.) 60, 00 (8, \text{ The true value.} \\
 \quad \quad 60, 00 \\
 \hline
 \quad \quad \dots
 \end{array}$$

N. B. 7 to 6, is the same proportion as 700 to 600.

Again,

Suppose a farmer has two other sorts of wheat, one of which will run 620 grains to an ounce, what is the value of that wheat per load, in proportion to the best wheat at 10 *l*.

The proportion is as follows.

$$\begin{array}{r}
 \text{£.} \qquad \qquad \text{£. s. d.} \\
 620 : 10 : : 600 : 9 : 13 : 4 : \text{Half penny, the} \\
 \text{value sought for; and worst than the best by} \\
 6 \text{ s. } 5 \text{ d. halfpenny per load.}
 \end{array}$$

Again,

Suppose 625 grains run to one ounce, what is the value of such wheat.

$$\begin{array}{r}
 \text{£.} \qquad \qquad \text{£. s.} \\
 625 : 10 : : 600 : 9 : 12, - \text{The value sought} \\
 \text{for, and worst than the best by } 8 \text{ s. per load.}
 \end{array}$$

Again,

Again,

Suppose the ounce to run 630 grains, what is the value.

£.                      £.   s.   d.

630 : 10 : : 600 : 9: 10: 5: Half penny, the value sought; and worst than the best by 9 s. 6 d. halfpenny per load.

From hence, the value of wheat may be nearly ascertained from the standard, according to the highest price the best wheat may bear.

I hope nothing more may be said to enforce the farmer to procure the finest wheat, as the difference in value is so evident by the first four calculations: and he must be fully convinced, that such fine wheat is not to be produced from too thick a crop, or from land, not in high cultivation.

M

APPEN-

## A P P E N D I X.

**A**S salts \* are principal assistants in vegetation, it may not be amiss to mention, how they unite or engender, as it were, with the earth, to cause such production.

To

\* I here confine myself to two sorts, called simple salts, Acid and Alkaline.

Acids are distinguished by their sour taste; effervescing with, and dissolving certain earths, as the ashes of vegetables.

Alkalies are distinguished by a pungent taste, extremely different from sourness; by their destroying the acidity of every kind of sour liquor.

When Acids and Alkalies meet, and are thus united, they are said to be saturated with one another, and form a neutral compound, from thence called neutral salts, which are the food of plants.

Alkaline salts are of two kinds. When burnt in a strong fire, they are called fixed salts; in a gentle warmth, Volatile.

Such is the specific attraction between Alkalies and Acids, that if both of them are previously saturated, the Alkali, for instance, with sulphur, and the Acid with metal, or mixing the



To go into a chymical analysis of salts, would rather be too complicated for this treatise: I shall therefore confine myself to speak of them in the plainest manner, and of such only which concern vegetation; whereby the farmer may not only try, and judge of manures himself, but of the manner in which they operate.

This I shall exemplify in the salts contained in wood-ashes, (I mention wood-ashes as being most known,) in softening hard water, as well as assisting more soft water for washing. It is not ashes, as merely ashes, which in the least conduce to answer the end: it is their salts only which produce the effect.

Ashes of all vegetables are, more or less, filled with salts, commonly called alkaline salts: wood-ashes as the most common, are mostly used, though less replete with salts than the more vegetable kinds; in particular the more pungent sorts, such as nettles and thistles, which abound with more, than the less offensive herbs: and it is to be remarked,  
that

the two solutions together, both the sulphur and the metal fall, leaving only the Alkali and the Acid combined in the liquor.

When green vegetables are calcined for manure, the oil should be as much retained in the salts as possible, by slowly incinerating the subject with a close smothering fire. See burning of clay, p. 29.

that the ashes of all, are much stronger when the herb, or wood is but just withered, than when dried; for in drying, the strong saline juices are exhausted.

The hardness of water proceeds from mineral, or vitriolic acids, with which it is more or less impregnated: alkaline salts being of a dissolvable quality, easily mix with the water acid; and by the specific attraction between acids and alkalines in uniting, the acid particles are blunted and destroyed by the predominate power of the alkali, and so the water is made fit for the business of washing. Alkalies in the composition of soap, are well known to the soap-boiler; for without such he could not unite the oil and other ingredients.

It is well known, that wood and other ashes are good manures, but in that business (as well as in the above) it is the salts that are contained in them, which make them manures; the salts attracting the acids of the earth, water, and air; and thus by their uniting, become part of the food of plants called neutral salts.

The acidity frequently complained of in the stomach, commonly called heart-burning, is often removed, by drinking the water in which marl-chalk is powdered and put, as many of the fine parts are swallowed; which being replete with salts,  
blunt

blunt and destroy the sharpness of the humour that causeth such uneasiness.

All nature is more or less impregnated with salts, in particular the animal and vegetable parts. In the animal, even the hair and horn-shavings of cows, bullocks, &c. are very full of salts, and even the bristles of hogs, to a great degree: and in the vegetable part, from the body of the tree to the thistle, all are more or less supplied with those alkaline juices; which, when burnt, the nitrous part of the juice is calcined to salt, called alkaline, or volatile salts.

Marls, either of the stony, earthy, clay, or shelly sorts, that are replete with saline particles, are called alkalizate bodies, on which acids have a great effect: but common salt being of so powerful a quality, acids have no effect on it \*, and therefore salt with vinegar does not produce any fermentation.

The power of opposition through the system of this globe, is the support of the whole; thus it is from

\* That is, salt being impregnated so very much by the marine acid of which it is made, that vinegar has no effect on it, till it is calcinated; in doing of which, lime should be mixed with the salt, and made into a sort of paste, and then into lumps of 7 or 8 pounds, and burned; then acids will have the same effect as with other alkalies.

from the firmament, down to the earth on which we are: " So look upon all the works of the most high, and there are two and two, one against another."

SIRACH.

For example, blend the heavy ponderous clay marl with the light sandy earths, and the light dilating manures with the heavy clogged ground, their salts, with the opposite acids, unite and consolidate the one, and warm and open the other.

All bodies contain fire, so this fire is an assistant in the vegetation of seed, and acts in the intestine commotion or fermentation in the earth. The *technical* term used by the chymist for this inherent fire, is *phlogiston*; but a late writer observes, a more intelligible word would be better, and therefore calls it invisible fire \*.

Let

\* The nature of fire is so wonderful and abstruse, that the ancients generally revered it as a god. A great man observes, " That the moderns can scarce name one point in all philosophy of more importance, and less understood."

" That fire, in effect, is the universal instrument of all motion and action in the universe: without fire, all bodies would become immoveable; as in a severe winter we actually see our fluids become solid for want thereof. Without fire,

man



Let it not seem strange to the reader, that I mention fire in the earth, or that this invisible fire is concerned in vegetation; for he may be assured there is no vegetation without fermentation, or fermentation without fire, be the seed ever so minute.

I mentioned a specific attraction between the salts in the ashes of animals, &c. and acids in the air, earth, and water; nothing can demonstrate it so much as putting either of the sorts into vinegar: the effect is instantly discovered, and its virtue (if any)

“ man would harden into a statue; and the very air cohere into a firm rigid mass.”

“ Fire then is the universal cause of all mutation, or change, for all mutation is by motion; and all motion by fire.”

“ Fire will dilate solid bodies.”

“ An iron rod or bar being heated, increases in all its dimensions; and the more so, as it is further and further heated: upon exposing it to the cold again, it contracts, and returns successively through all the degrees of its dilation, till it arrive at its first bulk; being never two minutes successively of the same magnitude.”

“ The same degree of fire rarifies fluids sooner, and in a greater degree than it does solids.”

“ Another effect of fire on bodies, is motion; for fire, in warming and dilating bodies, must of necessity move their parts.”

“ In effect, all the motion in nature arises from fire alone; and taking this away, all things become immoveable.”

any) immediately made known, by a sudden fermentation arising from the union of the salts and acids. If the ashes, or manures, are put into water, no such effect will be produced: therefore vinegar, as being a strong acid, is the test of marls, earths, clays, ashes, &c. for manure.

Marl manures even blended with the earth lie there, unlesened of their salutary virtue, till vegetation calls it; then, as soon as plant or seed is introduced, nature begins to operate, and fermentation ensues. By this process of nature, the earth is dilated and warmed to receive and cherish the infant production, with which it is charged, till it rises to strength and luxuriance.

Hence it appears, that earths of whatever degree of temperature, are only habitations for the roots of plants, and appointed receivers of their food; the nitrous particles of which, open the earthy texture, and thereby form those many small cavities, or delicate passages called pores; these pores admit moisture for the nourishment of what may be therein contained: and in earths, there are also (according to their texture) a cohesion of parts which protects the tender fibres of the plant, from the parching wind, or burning sun-beams. Withdraw from the earth all the nutritious juices, the remaining body will be a *caput mortuum*; and yet, its bulk seemingly not lessened.

In

In all mechanism, that is best which tends most to simplicity in its formation, and ease to the acting power: witness the ingenious contrivances of art and science to facilitate the work, and give ease to the workman. These two circumstances coinciding so strongly with the considerations of expence and profit, one would even think that man not rational, who does not desire to be informed of the best contrivances, and to adopt them.

In every art that man can cast his eye on, he discovers an ingenuity of contrivance, from the grander works of machinery, down to the neat, light, and simple tool of the joiner's moulding plane. I am sorry to except the plough from this general character: there is, indeed; in two or three counties, an improvement of that utensil which does them honour, I mean in Norfolk, Suffolk, and Essex, in most parts of these counties, they plow with two horses, and only one man; with which they plow not less than an acre a day, even of land the first time of breaking it up.

I am prepared against objections, when I would recommend this plough to my readers in these parts; but as the fact is really of great importance, I must be excused in pressing it. He that will not receive the good seed, to allude to scripture expression, must continue sowing tares and thistles, and reap the produce of filth.

In this treatise, I have therefore delineated a Norfolk two wheel plough, with the principal dimensions, sufficient to give the farmer an idea of its cheapness and advantage, in preference to the common plough of some other counties.

This plough, which has but one handle; was drawn from one in use belonging to Mr. Mumford, in Hants, a Norfolk gentleman, who has not only brought this utensil of husbandry from thence very prudently, but a Norfolk servant also, who will do his duty: for with this plough and two horses only, (without a driver) he ploughs no less than one acre a day in the winter, and often for barley and summer fallow, from one to two acres a day. Mr. Mumford informed me, that it is customary in Norfolk to make use of four horses in barley sowing and summer fallowing, in the following manner. From four in the morning, one pair of horses and one man are in the field till 8 o'clock; he then returns, takes care of his pair of horses, and refreshes himself; at which time another man goes out with another pair, and works till twelve; he then returns, and the first man with his pair retakes the plough, and continues till 4; at which time the other with his pair, replaces him, and continues till 8 o'clock; so that each pair of horses work 4 hours alternately,



ly, for 16 hours, and plough from one and a half, to two acres a day each pair.

Think not, that it is in sand this work is performed; no, it is the general work of the county, in which there are different soils, or earths, as in other counties. Neither think their horses *Patagonians*, or that the county is possessed with miraculous productions; but believe it is wisdom in this part of husbandry, and that the master, not the servant, commands. This, with a plough that may be carried on the shoulder, (I had near said put into the pocket) a pair of accustomed horses to walk with both eyes open, and a diligent ploughman, who has no chattering companion, are the true cause of this wonderful operation.

I shall take the liberty to mention what the gentlemen who are compilers of *England Displayed*, (now publishing in weekly numbers) have mentioned among other things of Norfolk, that they generally reap four quarters of wheat, and five of barley; which shews that the land is not so very light and sandy, and of course we may infer also, that the land is not shallower ploughed, than other land in general; if it was, it could not give that produce.

But not to dwell longer in Norfolk, let us take a view of some other counties, the remarks on which, (by the above mentioned society) will, I hope,

hope, free me from an unseemly partiality, relative to a two horse plough. These gentlemen in their observations on Hertfordshire, after reciting some disagreeable circumstances, “ say, their  
 “ ploughs and ditches are very bad ; if their  
 “ ditches are bad, their ploughs are worse, exceeding large and heavy, the mere draught of  
 “ the weight is enough for two horses, a share  
 “ commonly weighing 60, or 70 pounds ; never  
 “ less than four horses to the plough in a dry  
 “ light soil, after three or four earths (as they  
 “ call it) for turnips: the fifth, nay the tenth,  
 “ would not be given without four horses, or do  
 “ they ever turn more than an acre a day. Much  
 “ stronger lands than in Hertfordshire, are in  
 “ Suffolk and Essex, broke up for the first time  
 “ with a pair of horses, and one man who holds  
 “ and drives ; but then the plough is not above  
 “ half the weight of those in Hertfordshire. The  
 “ loss from this mistaken practice must be amazingly great, since the difference is just half ;  
 “ for the wear of these immense large ploughs,  
 “ cannot be less than double that of the small  
 “ ones, so that by a change in this particular,  
 “ double the quantity of land would be ploughed  
 “ in the same time, and at the same expence,  
 “ besides enjoying the capital advantage of being  
 “ twice

“ twice as speedy in critical seed-times : a point  
 “ often of importance.”

In respect to Suffolk, their plough is not only light, but in general is a swing plough, an advantage in expence worth noticing, and will always keep the ploughman alert : but as with the Norfolk plough, (the body of which is much the same with the Suffolk plough) the same obstinate objections will no doubt be made here : it may do, says one in Suffolk, but it won't do here : why not ?

Hear what *England Displayed* says, where Suffolk is treated of “ The Reverend Mr. Lord, at  
 “ Great Welnetham, raised 10 quarters of barley,  
 “ and 5, or 5 and an half quarters of wheat per  
 “ acre, from an indifferent wood-cock brick earth  
 “ soil, with a manure of clay and hollow ditch  
 “ scouring only.” A soil, that in some other counties they would put on 4, or 6 horses to the plough.

The tillage in Essex could not be carried on as it is, if it was not from the œconomical practice and use of a two horse plough. “ They plough  
 “ in the fallow for barley, after wheat four  
 “ times, throwing the land into ridges for the  
 “ winter season. The first frost they lay out a  
 “ manure of farm yard dung, mixed with turf  
 “ earth, 20 or 30 loads to an acre : the first dry  
 “ weather,

“ weather, from the last week in February, to the  
 “ middle of April, they plough the manure in,  
 “ which makes a fifth ploughing; and if the  
 “ barley is not sowed in March, they despair of a  
 “ great crop, their general crops being 5 quarters  
 “ and a half per acre. John Yeldham, Esq. at  
 “ Saling, reaps, on an average, 7 quarters of  
 “ barley per acre. Near Billericay they manure  
 “ at the expence of 10 l. per acre.”

These ploughings and expensive manurings could never be performed without such œconomy, which enables them to do twice the work with the same expence, as with a 4 horse plough.

Neither can I in justice pass over an observation made on the ploughs of Hampshire. “ That  
 “ the farmers here keep double the number of  
 “ horses really necessary. It is truly surprizing,  
 “ that persons who seem to be well acquainted  
 “ with rural affairs, should be so led by custom,  
 “ as to throw away great part of their profits,  
 “ merely to keep a large number of useless horses.”

From hence I cannot avoid inferring the impropriety of so mistaken a pride, against every useful information, which it is natural for man to embrace.

Let us now view the structure of this important utensil, and impartially dissect it! Let us compare its parts with the common working plough  
 of



of most other counties, the expence and ease to the draught.

As to the expence, the difference will readily appear, when the reader is told the timber work, or frame of the body costs about 4 s. the share, called a socket share, (as there is a socket into which the point of the ground piece enters, and is knocked on or off at pleasure) is about 8 or 10 pounds weight, nor is the coulter half the weight of the common one: the earth board is but 1 foot 11 inches, when that to the common plough is from 3 feet, to 3 feet 6 inches in length; and when this is iron, as it ought always to be, makes a considerable saving. I should also inform the reader, that there is still a much less expence of iron work to be obtained in either of these ploughs, viz. by using cast iron, or metal socket shares; earth boards, side and bottom lining pieces, the coulter, only of wrought iron. Cast iron is not half so dear, nor will wear out with fair labour in common earths, and any founder who makes metal weights, frames, and doors for breweries, &c. can cast them.

In respect to the draught, it is easy to conceive how 2 horses can do such work with one man. The whole friction from the point of the share, to the end of the plough, being but 2 feet 6 inches, and the earth board but one foot eleven. The  
length

length of the common two wheel plough, from the point of the share, to the end of that part which slides on the ground, has a friction of four feet ten inches or more, besides the length which hangs over where the end of the beam comes down; and an earth board generally 3 feet 6 inches. The length of the beam of the Norfolk plough is 5 feet 4 inches, or thereabout, and the common plough 8 feet: the extreme length from the whippins, or that part of the plough gear to which the traces of the hind horses are fastened, to the end of the beam in the Norfolk plough, is 6 feet 4 inches; and in the common plough 12 feet. When I mention the common plough, I mean the common plough of vanity, which the 4, or 6 gay horses are to draw. Some people must of course lessen that weighty and expensive utensil according to their horses, &c. and as a less plough with less power, can perform the same work in the common way; so it is evident to an axiom, this plough may be formed to do the same work with half the power of the common large plough.

I could dwell with pleasure on this subject much longer than may be thought necessary, as I think it cannot be too strongly urged; however, I leave it with my wishes in its favour, and beg to reassume a former very interesting matter, viz. feeding hogs on clover, &c. for though I endeavoured

voured to recommend it on the footing of my own experiments, I am now made additionally happy, from other accounts of its advantages; as they are given by some late authors, of deserved reputation. *Arthur Young*, Esq; in a treatise on hogs, tells us, Experiment the IV.

“ In the beginning of June 1766, I confined  
 “ 60 hogs, half and three fourths grown, in my hog  
 “ yard, (a pond’s mouth in it,) and fed them 14  
 “ days with clover, mown fresh every day; it  
 “ was given in their troughs, with racks across,  
 “ to prevent their soiling it. They fell off in their  
 “ looks in about 4 days, and grew worse, several  
 “ dying. At the end of that time, I gave them  
 “ some malt grains and wash every day, for a few  
 “ days longer : but the effect was no better, more  
 “ dying. They were then all turned into the  
 “ clover field, from whence they had been taken,  
 “ and confined constantly to it for some time.  
 “ Not one more died, for all throve greatly. It  
 “ will not perhaps be impertinent here to add,  
 “ that I never found any method of using clover  
 “ more beneficial than thus applying it to the  
 “ feeding of hogs. Experiment V. At the time  
 “ of the preceding experiment, 8 hogs of equal  
 “ size, were divided into two lots, and confined  
 “ to two styes, 4 were fed 14 days on clover  
 O mown,

“ mown, and the other 4 on lucern mown ; they  
 “ were given at the same time, and in the same  
 “ styes. At the end of that time they were view-  
 “ ed attentively : both were bad, but the clover  
 “ ones much the worst, one near dying.

Experiment VII. “ I draughted from my hogs  
 “ 20 that were of a perfect equality in size  
 “ and appearance ; they were even half grown :  
 “ marked them into 4 lots, and turned

No. 1 into my *clover field*.

2 - - *lucern ditto*.

3 - - *sain foin ditto*.

4 - - *burnet ditto*.

“ In another month they were drove up and  
 “ viewed ; and the result was,

No. 2 *the finest, lucern*.

1 *next, clover*.

3 *next, sain foin*.

4 *very indifferent, burnet*.

“ The result of this experiment, I think deci-  
 “ sive in favour of lucern, and likewise in the pro-  
 “ portionable merit of the other articles.

“ Of green food, that which is growing is clear-  
 “ ly the best : mown, and given in styes, it is per-  
 “ nicious.

“ In the field, lucern is superior to all the rest ;  
 “ clover comes next, then sain foin : all these are  
 “ good. Burnet last, and bad.”



At the same time that I extol Mr. Young's indefatigable process, I must observe, that what he has mentioned relative to feeding hogs in the sty with those artificial grasses, seemeth to be something premature; for I have seen hogs fed with clover, even without that proper precaution of a rack to keep it from being soiled, for many days together, which throve very well.

Mr. Young, has from his experiments pronounced positively. I must with great deference say, that they may be starved, either in the field or in the sty; but from my knowledge, if they are not stinted in quantity of clover, they will not fall off in 4 days, or 18 neither; though I prefer the field culture before the sty, as the pigs eat the clover, &c. with the natural dew on it, and therefore require less water.

I must trouble the reader's patience with a few more citations on the subject of clover for feeding of hogs, taken from *England Displayed*, as that publication may not fall into all the hands, which this treatise may.

“ Some of the farmers near Aylesford and Alton, Hampshire, sow clover for fattening their hogs, a piece of husbandry that cannot be too much recommended.”

The same writers in their observations on the husbandry of Sussex, remark with concern, “ that  
“ they

“ they are strangers to the method of feeding hogs with clover.”

And in treating of Oxfordshire husbandry, it is said; “ They have no dairies, and feed their hogs in summer with beans; so little are they acquainted with the method of feeding hogs with clover.”

“ Near Lavington in Wiltshire, there is an herb-  
age called knot-grass, for feeding hogs.”

Without troubling the reader with more quotations, I hope it will suffice to mention two experiments made in the Isle of Wight, by Mr. William Sivier of Dungewood, and Mr. Emanuel White of Compton-Grange. The former put a number of large hogs into a piece of clover, and penned, or divided the field with hurdles: but he found a difficulty in confining them in this manner, for want of being properly ringed; not that the hogs rooted up the clover, but that they raised up the hurdles: which, however will not prevent his pursuit of this part of husbandry, being satisfied of its immediate profit, and the service it does in manure.

The latter tied his sows in the clover field on the second growth, removing them as they eat down the clover; the cord was fastened round the sow's neck, and the litters run at large; he had a trough in the field, which he supplied with water.

The

The young pigs thrive to admiration, and were a finer parcel than he ever had before; neither were the sows, with tethering them, less in their advancement.

In respect to sea-sand, and sea-weed, or ore weed, as called in some maritime counties, I shall beg leave to speak a little more, as the practice comes so well authenticated from the same writers. Speaking of the husbandry of Cornwall, they say, "Ore weed should not be left to the sun and air, "it being a sub-marine plant, the juices are soon "exhaled. Covered, it dissolves into a fat oily "slime, which fattens and meliorates, cold stiff "land. It is best for tilled land, or sparingly "laid on pasture. There are four sorts, 1st. mixed "with lime, 2d. mixed with spar, 3d. mixed "with shells, 4th. mixed with coral. The sparry "sand is of a calcarious substance, and will ferment with acids. But the shelly sort is most "used. The coral is best where it can be got. "The latter is taken up in the sea, in Falmouth "harbour, with canvas bags, and sold at 10s. a "barge; they lay on from one, to one and a half "barge per acre."

In the account of Devonshire, Somersetshire, and Dorsetshire, we find sea sand, and ore weed are there used. Of Hampshire they say, "sea  
"weed

“ weed is used in some parts near the sea-coast,  
 “ but not any sea-sand, which may be regretted.”

“ In the southern part of Suffex, they make  
 “ great use of sea ore, and a compost dunghill of  
 “ that weed, but do not make use of the sand.”

I can experimentally affirm the value of this practice, both in respect to the sand, as well as to the ore weed; and beg leave to advise it to all persons contiguous to the sea; wishing that these corroborating accounts, may prevail with them to introduce it.

I cannot end without one observation more, on a manure often found at the bottom of marl-hills, in ditches and mill-ponds, (when so situated,) in large bodies.

I need not inform the farmer, that the lower part of a field is more fertile than the upper; this ariseth from a similar cause with the riches of a mill-pond, that is, the rich particles of the upland by moisture, are conveyed to the lower part, which increaseth the one, as it diminisheth the other.

When a stream at the foot of such hills spreads in a mill-pond, its current is then abated, and the fertile stranger subsideth in this new receptacle, till length of time forms as it were, a *mexico treasure*.

Such are the mill-ponds near Carisbrook in the Isle of Wight; I know the hidden treasure of these,



as I viewed some of it with much pleasure, which has occasionally been thrown out.

Shall the neighbouring land mourn for want, when such food is at hand? No, in the drought of summer, drain the pond, and diffuse it abroad to answer the end it was there collected for.

Thus, every reflection furnisheth man with wonder on the kindness of providence towards him; a treasure being conveyed into his arms, by only the simple course of a purling stream.

A SHORT

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E S S A Y  
ON

The Cause of Dearth of CORN and  
other PROVISIONS.

**I**N the latter part of my book, intitl'd *Winter Riches*, I promised my reader to lay before him the cause of the dearth of corn, &c. which I have taken the first opportunity to do, by adding it to this second edition of the *Rational Farmer*, without any addition to the price of the book; being ever happy in having an opportunity of communicating any thing that may tend to public utility.

But a discussion of this subject from me, I must confess, appears rather presuming; therefore I know not how to apologize for undertaking it. One resource however, I flatter myself there is to relieve me, namely, that my candid reader will place my good intentions before him, and with such, blot out its infirmities.

I shall

I shall consider the opinions which in general prevail relative to the dearth of corn. Some of which are,

First, To the engrossing it.

Secondly, To a combination between the farmer, miller and baker.

Thirdly, To the flour mills.

And first, in respect to engrossers of corn: it seems plain to common sense, that if no quantities of corn, immediately before or since the late rise, were to be found laid up in store-houses or granaries, engrossing could not be the cause of it. I live in a corn country, where there are as many store-houses, perhaps, as in any county in the kingdom, convenient for laying up corn; but these store-houses in general have been, and are at this time, quite empty, not one buyer has any quantity of corn by him; nor has had for a considerable time, which, I am pretty sure, is universally the case at present throughout the kingdom. I may differ, perhaps, from most people, but I cannot think that engrossing is always a crime.

No person would buy corn merely upon speculation, when the price is at 10*l.* or 12 *l.* per load, to keep it by him in expectation of a further advance.

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When corn is engrossed (if I may use the term in a good sense) it is at a time when there is great plenty, and the price low; which corn, if it be kept till a time of scarcity, and then sold out, is really of service to the poor.

“ Secondly, Another thing to which they ascribe the high price of corn, is a combination which they suppose the farmer, miller and baker have entered into for this purpose. This surely is so very idle and ridiculous, as not to deserve a serious refutation. Every one that is at all acquainted with the markets, knows that the farmer will ever sell as dear as he can, and that the dealer will buy as cheap as he can; the latter never having learned that the dearer he buys his wheat, the more will be his profit.

“ The profit of the miller, indeed, who grinds for toll, is ever proportionable to the current price of corn; but as he does nothing in the market, he is free from the imputation. The meal-man's profit may be more when wheat is at 5*l.* than when it is at 10*l.* per load; he can then carry on his business with much less capital, and therefore it is his interest to keep it low.

It was at first the great difference which people found on trial, between buying wheat and buying flour, that so suddenly and universally brought them



them to prefer the latter: and it is the same acknowledged difference, which engages them to continue it. The farmers are so far convinced of this, that many of them will buy flour for their families, finding they can serve them cheaper with it, than with their own wheat. A day labourer, who has any thing of a family, will save by buying flour, six-pence or nine-pence a week; wherefore they have so little reason to complain against their masters for not sparing them wheat, that they have, on the contrary, the greatest cause to complain that they are compelled by some of them to take wheat, when they know that they could save considerably by laying out their own money in flour.

It is well known that wheat bearing but a low price for some years before the late advance, was, by the farmers and old corn buyers, imputed to the flour mills, and they were strongly persuaded, and frequently asserted, that wheat would never obtain a price again, till the flour mills were down.—How strangely the case is altered!

But I have one thing more to subjoin, which will put the matter out of question, since all people will be true to their own interest. The bakers not many years ago, bought their own wheats, had them ground at the water-mills, and either  
with

with hand or horse-mills, dressed their own flour. You will allow that they must have in this way very great advantages in every article, beyond what a private house-keeper can pretend to; and yet no sooner had they an opportunity to procure their flour from the water-mills, but upon trial, finding the advantage of it, they fell into it, and their hand and horse-mills were laid aside. I have heard a baker (who through prejudice to custom, continued in the old way several years after others had quitted it) say, that he was some hundred pounds the worse for not buying his flour sooner, as others had done.

But what need of all this debate? we appeal to fact: let the matter be tried, it may be soon brought to an issue. Will the money that buys one bushel of flour, buy wheat enough to make 72 pounds of bread of equal fineness? If it will I give up the point.

Some people are for having granaries in every county for laying up corn in, and public mills to grind for the poor, with proper officers, &c. A fine scheme this to make employments, and answer most valuable purposes to some, though I will not answer for it that the poor, or the public, would be the better for it.

It

It is evident, that where corn can be kept, the rick is the best place to keep it in; but where corn must be imported in grain, some building is absolutely necessary for its further preservation. But how deficient that is to answer the end for any length of time, appears from the situation of corn kept in granaries in Holland; they having no other relief, are under that necessity. A celebrated writer observes, "The Dutch empty them, or rather change them every year, by consuming the old or last year's grain, and supplying its place with new."

The best granary is the *farmer's mow*.

With us the cure would be worse than the disease, as England is a corn country: as hence, exportation would cease, by hoarding up in a musty house, an overplus which otherwise would bring in large sums from abroad. This scheme must be attended with dangerous consequences: granaries ill attended; the country supporting a crowd of sycophants; a great expence to erect those magazines; and, at the year's end, selling the injured corn to the poor to bring on diseases, at a considerable loss to the capital sum, which must fall on the public.

It may be said, that having a year's stock of wheat before hand, we cannot ever suffer by bad seasons.

It

It is certain, that if a quantity of corn be in the land, individuals cannot be much distressed for want of its circulation; but where can the advantage arise to the kingdom by such a scheme? here is a large quantity of old fusty wheat, nursing up in every part of the kingdom, to be consumed yearly, when you have plenty of new sweet wheats, that by this scheme are to be laid up to be eat in rotation, in the same unwholesome manner. You may say, that if an over-abundance should offer to us by a plentiful crop, and good season, it may then be exported. I must ask which is to be exported, the old fusty wheats, or the new good wheat? If the old, I apprehend there are but few markets that would receive your damaged corn: if the new, you still entail a cruelty of forcing the people to eat food not fit for them. So that in every respect, as before observed, I am doubtful, in a corn country, such manner of keeping wheat would be worse than the disease.

Or suppose a year of plenty, when there may be a year and a half, or upwards, of stock, old and new, and exportation stopped, would it not be very prejudicial to the whole community? the plough would move but slow, rents ill paid, landlords cease to pay the tradesmen's bills, and tradesmen then bankrupting each other.

Since



Since then it does not appear that granaries will prevent a scarcity of good corn for public consumption, neither does it appear to me that the cause alledged on the monopolizer of farms, is by any means the cause of scarcity at any time. I say, it is not the *true* cause that has been alledged against them: namely, they being men of more wealth and opulence than a small farmer is supposed to be, can with-hold their corn from market, and so cause an artificial famine. How far this opinion has gained credit with the public; is confirmed by the general belief of it.

But were such monopolizers (as so called) to act on the principles alledged, when corn sells at a high price, and a promising crop on the ground; surely it must be against themselves.

If a farmer has a stock of wheat by him at the beginning of summer, and it appearing from many circumstances that the crop on the ground may turn out but poorly, it is then his interest, and for the interest of the public, to keep his corn, and not wantonly bring it to market till a time of more scarcity comes.

I say not wantonly, for it would be so if wheat was brought to market by a man who could keep it, and to sell at a time of plenty, when he foresaw scarcity approaching.

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I remember when wheat sold at 4*l.* 10*s.* and 5*l.* a load ; that old wheat ricks then were frequently to be seen after harvest, and at a time when there were large demands for it abroad, with some reasonable expectation of a rise, from a failure in other states ; and according to the situation of times, there was just the same reason for complaint, though none, at that time, was made.

But further, for argument's sake, let us now suppose every farm to be occupied as they were 40 or 50 years ago, and each farmer brought his wheat to market as fast as it could be threshed, and so sell in half a year near his whole stock, in order to discharge his landlord's demand. Why certainly, if the same quantity of wheat was to be sold in half a year, as, in the common course of consumption, might not have been sold in less than a year, the market of such half year would perhaps be at 6*l.* a load, instead of 8*l.* But softly, we are got through only half of the year, and most part of the year's stock gone ; what is now to be done ? Where are we to look for the other half year's supply ? Why truly, to foreign states, or the corn-merchant's store-house : if export has been open, 'tis gone where it cannot be recovered ; if found with the latter, 'tis so far a happy circumstance, although the populace cry  
would

would be against them, stiling any such, wherever found, forestallers, regraters, engrossers, kidders, badgers, &c. Now granting, that corn, under the past circumstances, be found in the corn merchants hands, pray, are they, or any other person buying in a fair market, to be blamed? No, every man has a right to buy in market whatever may be brought there for sale, otherwise markets would be useless, and its constitutional convenience destroyed. Sure this cannot be denied, it is really such a contradiction in itself to think otherwise, that it will not bear speaking on.

Notwithstanding the clamour against such purchasers, on one hand, and the rich farmer on the other, I shall take the liberty to pronounce it a blessing to find a support of wholesome food in either of the above-mentioned hands, they selling it at 25 per cent. through the other half year, advance profit.

Hence, does it appear that the keeping farmer can cause a scarcity, or the buyer who lays up a store in time of plenty? No surely, but the hasty seller may; the distressed little farmer, who lives in fear of his craving landlord, or frightened at his own shadow, may sell; and when sold, it is lost to future markets.

Another reason has been offered as a cause for the present dearness of wheat, viz. That the con-

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sumption

sumption must be greater than formerly, as the common people eat whiter bread than usually.

In general, I allow the common bread to be whiter : In many parts of England where the inhabitants can be served from flour mills, wheaten bread is a degree whiter than it was forty years past ; and on first speculation the reason may appear feasible ; but persons acquainted with the utility of the flour-mill mechanism, will not hesitate a moment on giving a negative to such a supposed cause.

For although the bread a labouring man eats at this day, may be whiter than it was forty years past, yet in quantity the consumption cannot be more ; because, the money that buys one bushel of flour, will not buy wheat enough to make 72 pounds of bread of equal fineness, ground, and stone dressed in the common way ; therefore, what is consumed in fineness, is fully compensated by increase of finer flour ; that is, a greater quantity of flour is produced, but poorer bran ; the flour being more shelled out of that thin covering, and better dressed in a proportion as 47 to 55 \*, or 8 pounds more flour in every bushel, or  
as

\* In the common mills, a loss of flour in weight occasioned by improper mechanism, is generally 17 pounds ; in good flour mills not more than 9 pounds.



as 5 bushels in every load, or 40 bushels; and one load in every 8 load of wheat so ground, Winchester measure, at 64 pounds to a bushel. Thus, the use of flour mills is a saving to the public of one thousand pounds sterling, in every eight thousand consumed.

It may be said, if flour-mills are of such advantage, surely every public and private baker will have recourse thereto for flour; for, as Mr. Hume observes, "Avarice, or the desire of gain is an universal passion, that operates at all times, in all places, and upon all persons."

However, there are exceptions in all cases, avarice is not universal; all people will not be true to their own interest; as has been mentioned, And although many farmers are convinced, that they can buy flour at the flour-mills cheaper than they can make such flour out of their own wheat, yet I know many that even avarice, or self interest, cannot have any effect on: nay, a thousand such instances daily appear before us; even the day labourer, whose interest ought to be so dear to him, like the more opulent, will continue obstinate against ocular demonstration so visible to him within his little circuit: many labourers, however, I know do embrace it, and find an advantage from sixpence to ninepence per week in their favour. Thus I presume, it may concluded,

ed, that this reason has as little stability in it, as any of the foregoing ones.

Since then it does not appear, that flour-mills, corn-merchants, rich farmers, or consumers of white bread, are the cause of scarcity of corn, it remains to be considered from whom, or what those calamities, which we often suffer, proceed.

To go properly into that inquiry, I must affirm, that such scarcity is not owing to any of the above alledged causes, for the past reasons, as well as the reason on which the parliament grounded a prohibition of exportation in the spring 1769, and renewed it in the spring 1770, and afterwards for 1771, which were from other and more surer truths, namely, there not being, on the strictest inquiry, more wheat in England than would supply itself, and government demands, till another harvest came round. So true were their informations, that [although it seemed, by the face of markets at that time, that a prohibition was hurtful; yet, before the then next harvest of 1770, (at which time I made this observation) the markets shewed the wisdom of parliament; wheat rising for want of produce from 8 l. and under, to upwards of 11 l. per load, (eight gallon measure) in some parts; and to 12 l. 10 s. and even 13 l. in many parts of England.

Thus

Thus the sowing of 1767 and 1768 produced no greater crop than was necessary for home consumption, and to Ireland, to which place there was a great demand, and some to our Mediterranean and African garrisons ; the principal supply of which, with our southern islands, were from North America.

The calamitous times, some few years back, were from two causes ; one, for want of a proper growth of wheat ; the other, wet seasons injuring the grain at harvest. We should have been equally as miserable these last two years, had not providence blest us with good weather at the time of gathering the fruits of the earth ; as the first cause held against us.

From the whole then, I think it past doubt, as to the cause, it appearing to me to be from an insufficiency of growth ; no more corn being produced than what, with good weather at harvest, supplied home consumption. This being the fact, leads us to an inquiry how this comes about, as more acres are under tillage than formerly were.

And first, it is allowed by all, that there is one third more of land under tillage at this time, than there was 40 years ago.

Secondly, that when there was one third fewer acres under tillage than at this time, there was not only a sufficient growth for home consumption, but a quantity, not for one year only, but  
20 years

20 years together, viz. 1726 to 1746, exported, to the amount of 4,461,337 quarters, 4 bushels, amounting to a sum of 6,654,828 l. 8 s. 9 d. And from the year 1746 to 1765, nineteen years, the export of wheat was much greater, viz. 6,800,017 quarters, 1 bushel, amounting to a sum of 10,766,693 l. 15 s. 7 d, which last quantity was mostly exported from the year 1746 to 1757. England having received in some of those years one million of pounds from France alone.

In the year 1689, the bounty on exportation was given to encourage tillage, from which time wheat has been growing cheaper, till within these few years; before the bounty was granted, it kept rising. From the year 1697 to 1706, the export principally began, in which nine years it amounted to a sum of 1,002,071 l. 17 s. 9 d. and from thence to the above era, 1726, it amounted to a sum of 4,448,843 l. 17 s. and so continued, for the most part, as above, increasing till the beginning of the year 1769, when parliament confirmed the royal interfering in a prohibition, (before they met) and continued it till the next meeting of parliament, and so on through 1770 and 1771.

Those

Note. It is computed that the freight of corn exported from 1697 to 1765, amounted to 3 millions. The greatest export was in the year 1750, wheat at 1 l. 12 s. 6 d. per quarter.



Those increasing years proceeded, first, from the encouragement of the bounty, which stimulated the farmer to break up more land: and secondly, as more and more fresh land was brought into tillage, quantities encreased, till at length there was no more fresh land to bring in: old tillage land worn out from its wonted fruitfulness; and encrease ceased. So that for near 3 years back, no more corn has been produced from the enlargement of tillage, than barely to supply ourselves.

Thirdly, the bounty continuing, no corn to export, and 1,600,000 acres under wheat, instead of 1,066,666 $\frac{3}{4}$ \*, out of which were exported 223,066 quarters at that time, may still continue a matter of surprise; though, at the same time, it leads us to the true and only cause of deficiency, viz. a failure in agriculture; a failure in the land; an improper mode, and unskilful masters †.

It may be asked, is not tillage the same as it was during the encreasing crops, and large exportations?

\* The number of acres under wheat 40 years ago.

† England is supposed to contain about 30 millions of acres. One million six hundred thousand under wheat; 13 millions four hundred under other arable land; and 15 millions under common pasture and woods, called waste.

Growth of wheat on 1,600,000 acres, is computed to be 4,050,771 quarters, or 32,406,168 bushels; or as 20 bushels 1 peck, and a fractional part, to one acre.

portations? And is not the ground as capable of producing such crops now as formerly?

I answer; tillage is the same, but the ground is not the same; that is, the spirit, the constitution, the fruitfulness, is not the same. At the time that land was fresh, young, and unworn out with labour, it produced its vigorous strength; but when that failed, another different diet and mode of application became necessary to restore it, which has not yet taken root. When lands were more divided into tenements, or small farms, each occupier was under a necessity of labouring his land well, to pay his rent, and breed up a large family; therefore, what he had to till, he tilled well.

The first produce of this youthful land was from nature; when that began to fail, it was fed with dung and marl, or such manures as were found most convenient to the respective situations of people; but when oppressed by continual hard labour; it at length was obliged to submit to infirmities incident to a weak constitution; the farmer continually dunging to produce weeds, and ploughing only to destroy what he himself was daily labouring for, viz. a good crop of wheat. It is difficult indeed to cure a disorder when the disease is not known; remove the cause, and the cure is effected. The farmer knowing not how to change his

his medicine with the change of disease, continues applications of poison, which adds fuel to the fire.

This, and this alone, appears to be the true cause: for remedy of which, the change, or new culture of land is fully set forth in this treatise, and *Winter Riches*.

From the account laid before parliament in 1766, of the growth, exports, &c. from 1697, to 1765, it appears, on an average of 68 years, the export of wheat to have been per year, 210,771 quarters, at a sum of 21,023 l. 5 s. at the rate of 1 l. 12 s. per quarter: the last 19 years of which, viz, from 1746 to 1765, the average run at 357,895 quarters, 5 bushels, at a price nearly of 1 l. 11 s. 8 d. per quarter, amounting to, in these 19 years, at an average, 566,668 l. 1 s. 0 d.  $\frac{1}{2}$ . The loss in that proportion for 1769, 1770, and 1771, only is, 1,700, 004 l. 3 s. 1 d.  $\frac{1}{2}$ .

Hence, according to the present mode of tillage, it appears that, every year exportation don't take place, a sum of 566,668 l. 1 s. and one halfpenny, is lost to the kingdom. But, if land had been judiciously managed since the time of its great effort, namely, from the year 1745, to 1750, when the fresh taken in land under tillage was in its prime, a much greater advantage

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would

would have arose to us; for those 5 years only, brought in a sum of 7,045,786 pounds sterling. It was then we received from France alone, a million at a time, the price of wheat being in the year of greatest export, viz. 1750, at 1 *l.* 12 *s.* 6 *d.* per quarter; the next year it rose to 1 *l.* 18 *s.* 6 *d.* per quarter, export lessening every year since.

The attention of the little farmers was confined to labour, and breeding up their families to hard work. The attention of the present great farmer, who occupies three or four such little farms, is to do the tillage work with little expence and slovenliness, that they may breed up their children, as they mistakenly call it, gentlemen and gentlewomen; that is, idlers with poor pride,

In order to obtain this, as an equivalent against the expence of now many strange servants, a quantity of land from two to four farms, being got into their hands, two teams are employed to do what three used to have work enough to accomplish; by which, the land is ploughed one third less than usual\*, together with the worn out state of the ground, makes it very clear how this deficiency is brought about.

Land

\* I know several farmers who plough a wheat stubble but once for barley, and not very light land neither.



Land being thus treated, and the occupier bent against instructions, it cannot yield its wonted produce, being bruised, and belly starved. However, it is yet recoverable; the state requires it, and every individual has a right to call on the tiller of land to treat it in a manner most fit for the public good; he being a trustee for the public, by taking on him, and occupying land which God hath given for the public support; whereby he becomes an agent under God to provide bread for the support of his creation. I heartily wish every man who attempts to arrogate over kind nature, and the fruitful earth, would first say to himself, am I more than man!

Having thus proved from the highest authority, and corroborating circumstances, that a prohibition of exportation of wheat, has been from want of a sufficient quantity of yield, together with the cause, I shall next endeavour to shew from whence flesh meats have rose to so great a price, on tillage account only.

The price of provisions in general, have a dependency on each other; when beef rises, all the other lower meats follow: as in corn, when wheat bears a high price, all the inferior grain rises in proportion; and generally a plenteous year of corn reduceth flesh meat in price. But in the case before us, the high price of flesh meat

has

has been for want of the usual pasture\* to breed up horned cattle on ; less pasture for cows, as well as sheep, and not a sufficient substitute prepared for them in the pinching spring : fewer calves reared, and a less quantity of butter and cheese through all the corn countries in England, so much that there are but few large, or small farms under tillage, whose support of cheese is half within itself, when 40 years ago such had an over-abundance.

Thus, as before observed, tillage increasing, pasture decreased, and by adding a third to one, a third was lessened in the other.

As in the causes assigned by many, relative to the scarcity of corn, so many vague causes has been offered to the public in respect to flesh meat.

The farmer, to cover his ignorance in tillage, lays all the blame of bad crops to bad seasons ; who, together with the grazier, charges the horse breeder with the cause of scarcity of flesh meat.

Let

\* It is a pity that landlords, for a small lucre, suffered the tenants to break up the fine old meads : it is now a curiosity to see one. A recent lease has been granted to a friend of mine, at 10 l. a year advance rent, for which he was suffered to break up 40 acres of as good dairy pasture as any in the county.

Let us examine into this allegation.

Has the pasture land-holders forbore dairies, and rearing calves, bullocks, &c. and thrown such land under breeding horses. If that be not the case, the allegation is false. Has any one yet pointed out where tillage, or dairies were the basis of any one place or county, that such had been laid aside, and horse-breeding introduced as a stock? No, but ocular demonstration informs every one, that tillage has turned out the calf and the bullock, and the fatting ox drove from his pasture, by the over-bearing plough.

Horses have borne a great price, perhaps equal to any other land commodity. I know not what is exempted from a high price, in respect to things 40 or 50 years ago: I speak within memory; but does it appear from thence, that horses are the cause of the dearness of wheat or flesh meat, more than this one rule, that all things rise or fall in proportion as things are depending on each other, always taking its course from the first principal.

For instance, what enables the woollen manufacturer to make certain priced cloth better or worse, but dear, or cheapness of wool, high or low labour, &c. What causeth a quantity of wool? the well wintering of sheep. Thus it is through the whole state, every thing depending

on

on each other; the landlord depending on the labouring tenant, and the tenant on the landlord, for letting him hold his property.

This analogy is in the body politic, as well as in the loftiest spire, whose stupendous height depends on stone and stone from the humble basis of pressed earth.

From the whole may be gathered these solutions.

First, The true cause of the scarcity of corn.

This may be deduced to these three observations: as men holding more land than they properly till: a rise of land, against which the tenant thinks to ballance, by lessening expence of labour, thereby committing a great error, by endeavouring to relieve a lesser. And lastly, Land being worn out with drudgery, and the occupier's ignorance, in not knowing how to redeem it.

Secondly, For scarcity of flesh meat we need not have recourse further than to the additional tillage of fine old rich pasture land. Restore pasture, and you will increase stock, and by increase of stock, meat becomes cheaper; and by lessening the present quantity of tillage, the remaining part will be better cultivated, and produce more, unless the present mode in tillage be reversed.

Thus,



Thus, as far as I am able, I have pointed out the true cause of complaint: it remains next to be considered, how much the loss of exportation affect the kingdom in general.

That exports are the enrichers of any country, no one will presume to deny; imports, the contrary effect; this being even an axiom, yet there are exceptions and restrictions to be wisely used in both. Some are of opinion that exports should never be stopt, even be the price of corn what it may. So thought the French counsel in 1764, when the king's edict appeared to encourage agriculture, exportation was made perpetual and irrevocable. However, this perpetual and irrevocable edict was but of short duration, for, in July 1770, an arret appeared in France with these words. "The scarcity of corn, and the dearth of bread, in several provinces of the kingdom, have excited riots and complaints in different parts: his most Christian Majesty has issued an arrêt du conseil, prohibiting the exportation, and permitting importation, till further orders."

The situation of France at this time, in respect to the scarcity of bread, is by no means to be considered for want of tillage; in which, no people are more assiduous, or has men so eminent in that science, though it may not be so universal. Believe me, they are not half a century behind any;  
and

and I may justly say, their tillage is more to be dreaded, than their mighty fleets, or numerous armies. Our boasting island has the effect of calamity yet recent among us; it was felt too much, even in the midst of our vaunting tillage, to be forgot in 8 or 10 years; therefore, the present distress in France ought not to be finally imputed to want of tillage.\*

I shall further consider how far the monopolizers of farms affect the community.

First, Has tillage increased by it?

Secondly, Has it not depopulated an industrious and laborious set of people?

Thirdly, Are the poor lessened or increased by it? If increased, does not the small farms bear more in proportion to their relief than the large farms?

Fourthly, Is it not of more advantage to the land lord to divide, than to join farms?

And, first, Has tillage increased by it?

It must be confessed, that more land has been ploughed up by it in the small farms, as well as in the large; for when the opulent farmer, whose terms with the land-lord were in general lower than the divided were, and had got liberty to break  
up

\* The taxes on the farmers in France amount often to half the rent of the farm.

up fresh ground, alledging that the poor little farmer had impoverished the land so much as to render it incapable of producing a crop without resting; they obtained liberty to break up what had not been touched with the plough in the memory of man.

In consequence of this, the small farms also applied, and got much the same permission with a little advance of rent; by this means, an increase of ploughing commenced, and on this new acquisition to the plough, together with the former, a large quantity of corn was added to the kingdom, and so continued till the new land became as bad as the old, having no substitute of relief, but dung, marl, and fallow: so all in time came to one state.

It might be asked, does not the opulent farmer, who has monopolized farms, till the land better and more effectually than the weak farmer? No, he not being satisfied with the advantage of not keeping or breeding up three or four families, which formerly the same lands were obliged to do, but to keep less labour also, and so plough the land less; that instead of three or four earths or ploughings, gives it but two, and sometimes but one, without any other manuring substitute.

This not being the case with the little farmer before the addition of fresh pasture land, taken

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from

from the cow or bullock, and added to tillage, as he had but small profit and a large family, was naturally under the necessity of being very laborious and attentive to the plough: his ideas carrying him no further than his industrious and laborious family, (who did all the work of the farm) and to secure his land-lords rent, bent his mind wholly thereto: he went to market with his little cart, and contented himself there with a mug of ale. The proud insinuations of their followers, that such was not fit, or could not, for want of a purse, till the land, is notoriously confuted by the small produce which they at this time deliver to the public.

Thus, land has increased under the plough, but good tillage and yield, decreased; which the occupiers charge to bad seasons, constantly upbraiding their God with unkindness, to acquit themselves of imprudence.

Secondly, Has it not depopulated an industrious and laborious set of people?

This question leads me to some of the principles of agriculture among the Romans; who were not only extremely attentive to the thorough culture of their land, but also, even in the later time of the republick, laid it down as a maxim to be followed



lowed by all good husbandmen \* (which all good tillers of land were then called) to sow but little and plough much. This is strictly enjoined by Virgil and Pliny, who instance the husbandry of Cresinus, as an example of the good effects of this practice, " laments the deplorable condition of  
 " Italy, when rich men, with the help of their  
 " numerous slaves, farmed large districts of land ;  
 " because it diminished the number of Roman  
 " citizens, and rendered the country less fruit-  
 " ful : for as both he and Columella observes, the  
 " Romans then became dependant on other na-  
 " tions for the means of subsistence."

Large farms, says " Mago † the Carthaginian,  
 " must in general, render the farm stronger than  
 " the farmer, whereby it necessarily becomes less  
 " fruitful ; this practice is attended with another  
 " most fatal consequence to a manufacturing and  
 " trading people, it lessens the number of inha-  
 " bitants in the country, from whence only the  
 " supply

\* *Husbandman* is the true title for a tiller of land, *farmer* being an abuse to the occupation, as it means a single householder, as well as a holder of land, from the French word *ferme*, to hold a lease of a house, or land.

† Mago, whom Columella calls *rusticationis parentum*, had 28 books translated into Latin by order of the senate.

“ supply of population arises ; for cities and large towns are always an expence of men.”

This depopulation is evident almost all over England, several parishes are lessened within my knowledge from ten to fifty, creditable industrious families, who bred up, on their small farms, six or eight children ; those who were necessary to assist in the work, staid at home after they had obtained a little schooling, and laboured as servants with their parents, who of course were more attentive and truer to their trust, than strangers bred in poverty generally are. This fitted them better for a servant's task abroad : and who is so fit to be a servant as those bred up in true labour and honesty ?

It may be said these people are not lost to the state, for though they are not farmers, continued in their father's farm, they may however be useful labourers.

That labourers are increased is true, but that good parish labourers are so, I must deny ; for when these are married and settled, they have the parish support in view : children multiply, a sick wife, and an attendant husband, who ought to be a tender man, but not to take such advantage to cover idleness. Parish support immediately comes on, and they work but little whilst they can get that ; a small family brought up in poverty, laziness,

ziness, and thieving follows; who really think it no crime to steal from the farmer. Bred up in this state, can such be useful members? Can such be useful servants, unless it be to get, or be got with child the first opportunity, then married, and last of all a parish settlement?

Thus, the opulent farmer becomes outrageous at the increasing poor, and the poor cursing the farmer; whom, they say, grinds the face of the poor.

I must observe, that according to our present constitution, our great indulgence to the poorer sort, is rather encouraging vice; as care is not taken to breed up those families to some employment; and it must inevitably continue so, unless work-houses\* in each parish are prepared for them as soon as they apply for relief; then the small family will immediately be initiated into labour, brought up to work, and help to maintain themselves; instead of lying about in nastiness and rags, thieving, idleness, and every thing to corrupt their weak morals: all of which populates idlers, but depopulates industry.

Thirdly, Are the poor lessened by it, or increased? if increased, does not the present small farms,

\* I mean a house of labour, not a common poor house.

farms, bear more in proportion to their relief, than large farms?

In proportion to the increase of labourers, or low tradesmen, so much in proportion must the poor on the parish book increase; that such increase of labourers is evident from the last or second head; so many more are added to that rank by being turned out of the small farms they held; or we must suppose them to be sunk into the earth of these farms, so rapaciously taken from them; however, they are not lost, the treble farm occupier finds them on the poor rate, though not in proportion as the single small farm does.

For though the poor rate is adjusted to each rent of holding, yet, here is now but one family to be bred up on the same rent, that before this tri-union of farms, there were three families to be supported. If one man occupies as much as three other men under the same circumstances of rent and land; these three men bear a burthen in proportion as 3 is to 1, over the rated rent; consequently, all small farms bear a greater proportion not only to the poor, but to every other parish rate, as the quantity of holding is not equal to the family to be reared.

Fourthly, Is it not of more advantage to the land-lord to divide than to join farms?

Fewer



Fewer tenants, and less rent, is not an advantage. On the contrary, more tenants and more rent is an advantage; therefore, to keep the farms divided is the land-lord's interest.\*

Lastly, From the whole may be inferred.

That large monopolizers have been the cause of breaking up most of the pasturage on each farm, depriving the community thereby of the usual supply of flesh meat, and added no advantage to tillage.

That they have depopulated an industrious, honest, and laborious set of families, deprived the king of a supply from such, who must now have recourse to people of less morals.

That the poor are increased thereby, and every parishoner (except the monopolizers) more proportionably burthened with the rates of the parish.

And lastly, The land-lords have injured themselves by it, who, with the tenants, are the cause of all the grievances.

To conclude this subject:

Similar to the above, tho' from a different cause of depopulation, was a statute made in the 4 Henry 7.

1489.

\* Small farms in general, pay a higher rent in proportion than large farms. But, says the landlord, repairs are less. To balance which, and encourage the tenant, give a 31 years lease, and oblige the tenant to keep all in repair. Then the landlord would come nearer to a certainty of his real rent-roll; at present, such is only an imaginary one.

1489. relative to England in general, to prevent arable land being converted into pasture: and the same year, an act was made relating to the Isle of Wight in particular.

The present mode is a great deal of arable, and little pasture, not more wheat, but fewer cattle, circumstances that call loudly for parliamentary interposition.

Thus having briefly explained myself relative to the first cause of the present distress; namely, less yield of wheat, and fewer cattle reared, I come secondly to consider and explain the monopolizing of what few cattle are reared, so far as it affects the high price of flesh meat, when fit for the market.

This comes under the following heads :

First, The salesman. Secondly, The carcase butcher. Thirdly, The retailer of meat, commonly called a butcher.

And first, the salesman who occupies large tracts of adjacent fields, where he can draw for the market from one, to one hundred bullocks a day, and when these fields are stocked, he then hires by the week, more distant and cheaper conveniencies, from whence he may replenish his market fields.

Under this circumstance, the salesman makes himself master of the first charge or expence on the

the public, by selling, or not selling (if he cannot get his price) if he does not sell according to his avaricious soul, the cattle are remanded back until another day. Must mouths be stopped, and families kept together without food? no, he knows it, and knows too well, that the market must come to his price, not his to the market. If these robbing pests (I won't say worse) to society, were abolished, if this nuisance to thousands of thousands were removed, would this be the case? no, surely, the farmer or his man must come with their cattle and sell, and when they come to market, will, nay, must sell.

The salesman's transaction is so bare-faced and notorious, so open, so unreserved, that every hour it is done in the midst of light: no private roads, no secret channels of conveyance are here artficed. When a retailing butcher applies for an ox or two, a few calves, half a score sheep, or a score of lambs, he tells him, I must have such a price: it 'is too much, says the retailer? I will give you so much. No, sir, says the salesman, I can have more than that sum and sell the whole parcel; I won't plague myself with selling in small divisions, there is more plague and trouble with one of you piddling retailing butchers, than with all the carcase butchers in town; turns dis-

T

dainfully

dainfully away, and leaves the poor retailer to seek for meat from the wholesale engrosser.

Which brings the second head into consideration, namely, the carcase, or wholesale butcher.

These so called, are a set of monopolizers, if possible, of much greater nuisance than the salesman. The salesman only monopolizes for the slaughter, but the slaughterer or carcase butcher, monopolizes both: his weighty purse conveys him also to country quarters; he, like the other, engrosses as many as he can; he, with the engrossing salesman, gives the farmer a high price for his cattle in order to keep him at home, and so break the farmer off from market connections with a retailing butcher, well knowing, if that can be secured, the price of meat must absolutely be in the power, and at the will of him, and his friend the salesman. The salesman, conscious of this country intrusion of the carcase butcher, whose purse may have more influence in the country than the salesman's application to the farmer to send his cattle to town, does all that lies in his power to counteract that step of the carcase butcher, by selling to him, and him only, the cattle he engrosses, or is consigned to him.

Hence, a connection is formed between these two forestalling, engrossing, and double-dealing creatures,



creatures, who not only steal and plunder the comforts of life at one hundred miles distance, but both in conjunction, pluck out the vitals before the face of all mankind, and leave the individual to moan and bewail, or fly into agonies and curse the rulers, and sham pretended good government they live under; revolting a loyal mind into breasts swelling with rage and disloyalty; perishing in the midst of plenty; starving with meat hanging before their eyes, till at length the desperate disease brings on a desperate cure.

This leads me to the third and last head, namely, the retailing butcher, which I shall presume hereafter to term the retailer of meat, as not being a butcher.

Under the two last heads it evidently appears, that a third must follow to effect the ruin; namely, the retailer of meats.

Can any man suppose this person to be more conscientious than his greater brethren: has he not an example before him? has he not, think you, an ambition to be one of these great men, and as good a right as those? Will he not make use of every stratagem to enhance the price, and keep up the retailing market as much as he can? have not the salesman and carcase butcher furnished the retailer with ample materials to work on? Is not the price of meat in Smithfield  
Market

Market a secret with the few, and must not the price given to the carcase butcher, by the retailer, be to them (from the public) a secret also? I say (with much concern) Smithfield Market is a secret with the few; it is confined to a few; namely, the two connected, forestalling, and engrossing wretches, between whom almost alone the market centers; and as such it is forestalling and engrossing, although it may partly be under cover of the market, as they are sold again from that market purchase, that, or the ensuing day: where a number of beasts fall into one carcase butcher's hand (if it were not for the connection) they would be in the hands of one hundred, and, of course, the market price of Smithfield would be nearly ascertained, whereby an imposition of fraud could not be carried on with impunity.

Thus, the retailer has it in his power to put what price he pleases on his meat; complaints to him is like speaking to a deaf adder. Go, says he, to the salesmen and the carcase butchers, complain to them; which would indeed have as little effect, as to ask life from the invidious executioner.

These three, with the farmer, making four profits on the consumer instead of two, it need not be wondered at (with what has been observed before on pasture being lessened) how provisions

vifions ſhould riſe to ſo enormous a price. But why it ſhould paſs ſo unnoticed from time to time, may be accounted for in common, as it is generally obſerved, what is every body's, is nobody's buſineſs: thus, public injuries are often, too often neglected. The care of markets are undoubtedly under the immediate eye of the chief magiſtrate: but ſuppoſe this officer or guardian of his city ſhould go to Smithfield every market day, and ſee the carcaſe butcher buy a quantity of cattle, and the retailer there alſo, and cannot buy any: Quere, What can his lordſhip do? is the carcaſe butcher exerciſing a trade with, or againſt law? With law\*. Where then is the remedy. If the head officer can procure proof of foreſtalling and engroſſing, contrary to law, the offending perſon is then puniſhable. His lordſhip can inſpect the retailing market, and puniſh for bad meats being expoſed to ſale, &c. But can this officer tell the retailer what price he ſhall, or ſhall not ſell his meat at; by what rule can that be determined? not like regulating the price of loaves; there he has a ſtandard to go by, he has the middle price of wheat laid before him; but where is, or can that regulation

\* An act of parliament, early granted, then annulled, and again revived in Queen Ann's reign.

regulation take place in meats? The baker can be compelled to make his loaf of such whiteness and weight as the law directs; but a butcher cannot be compelled to make his meat of equal goodness, therefore the field is open and spacious for the retailer to rove his prices in.

Again, The butchery tribe will sometimes tell you, there has been a great loss of cattle through disorders; another time, the past summer, either too wet or too dry, did not produce much grass, that the cattle did not fatten well, or loss of hay by bad seasons, which prevented the farmer from properly supporting them through the winter. Another time they tell you the spring was bad, grass did not come on early, and by the long winter, hay was all consumed; and that the farmer, under these circumstances, was obliged to support his cattle with more expensive food; with many such Robinhood nonsensical tales. This the public are told, but they have not been told when the farmer's vegetables and hay were consumed, what the more expensive food his bullocks were fed with. I am inclinable to believe, it was no other food than a production from the brains of the above idle tale bearers.

However, the subject is too serious to be trifled with, requiring the aid of every lover of his country to assist in forming a permanent regulation,



tion, to prevent for the future, all the evils attending this desolation; to lay the axe to the root of the tree, and at once fell the two over-grown monsters.

I having in the former part of this essay, explained the cause of fewer cattle being reared than formerly, as being the first cause; and have here also endeavoured to shew the finishing stroke given by others, namely, the salesman, the carcase butcher, and meat retailer. How these humours, that have got such hold in the constitution are to be eradicated, requires the utmost judgment and resolution. I conceive there are many things to be digested, but not any unconquerable. Things that cannot be adjusted in a garret, or be decided by an unruly mob; the facts are true, tho' perhaps not forcibly enough explained: truth and precision was the principle, and if in either I have erred, the error rests in a good conscience.

I shall only, in a few words more, request the guardians of this kingdom, the trustees of the people, the watchmen of our lives and liberties, into whose hands every individual's security is placed, to step forth unprejudiced, with impartial fortitude. Remove, no, utterly abolish every obstruction that appears to impede public welfare; great evils must be erased, although a smaller may be introduced: private interest must submit

submit to public good: this is a principle that I hope all will allow; it is the first principle in social life, it is the test of a well governed constitution, and the characteristic of a princely mind; and there is not, I dare presume to say, any doubt, but that in due time these premises will be taken into the *royal breast*, where every *eye* is fixed, and every *heart* placed, to receive with grateful thanks the blessing of relief, from a most gracious KING.

F I N I S,



